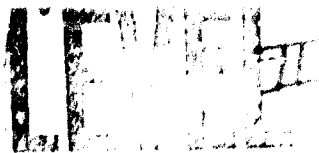


AD-A062805

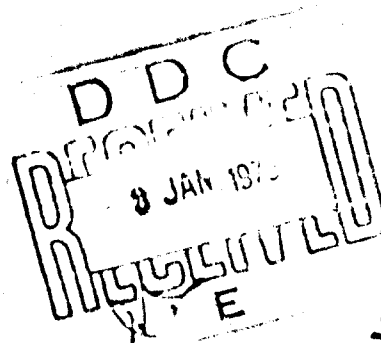


1

R-977  
INERTIAL NAVIGATION SYSTEM STANDARDIZED  
SOFTWARE DEVELOPMENT  
FINAL TECHNICAL REPORT  
Volume IV of IV  
PROGRAM LISTINGS  
June 1976



**The Charles Stark Draper Laboratory, Inc.**  
Cambridge, Massachusetts 02139



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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Inertial Navigation Computer Algorithms Computation Errors		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Section 1 of Volume IV contains the listings of the variable precision form of the numerical simulator program, VUMSIM. In this version all the "flight code" (i.e., simulated navigation computer operations) is performed in a user-specified floating point format, providing the capability of simulating a reduced computer word length. Appropriate library subroutines, for the specified word length, are automatically incorporated (for sine-cosine, square root, and arc tangent). The special routines called are those with names starting with the letter V. The remaining "flight code"		

DD FORM 1473

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EDITION OF 1 NOV 55 IS OBSOLETE

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20. Abstract (continued)

is modified to call the variable precision routines. The "ideal" IMU simulator portion of the program is unchanged from NUMSIM.

Section 2 contains the listings of the numerical simulator proper, NUMSIM, as described in Volume III, without the variable precision option.

Both NUMSIM and VUMSIM accept instantaneous values of specific force in the local vertical wander azimuth frame from PROFGEN at the trajectory sample rate and output the integrals of specific force in the simulated IMU frame to the "flight code" at the appropriate attitude of navigation rate. Subsequent modifications to NUMSIM/VUMSIM, to accept integrals of specific force in the appropriate IMU frame directly from PROFGEN are described in the addendum.

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INERTIAL NAVIGATION SYSTEM STANDARDIZED  
SOFTWARE DEVELOPMENT

FINAL TECHNICAL REPORT

VOLUME IV

Program Listings

June 1976

Approved: W. G. Denhard

W. G. Denhard

The Charles Stark Draper Laboratory, Inc.

Cambridge, Massachusetts 02139

78 11 14 01

## PREFACE

### ~~ACKNOWLEDGEMENT~~

This four-volume report was prepared under USAF Contract F33615-75-C-1149 by Charles Stark Draper Laboratory, Inc., Cambridge, Massachusetts, in accordance with Section 4 of the contract. The monitoring Air Force project engineer is Captain E. Harrington (RWA-2), Air Force Avionics Laboratory, ~~Dayton~~, Ohio.

The Draper Laboratory Program Manager for this task is Dr. George T. Schmidt and the Lead Engineer is Arthur Ciccolo. The coordinator of this report is Janusz Sciegienny and the authors are Janusz Sciegienny, Roy Nurse, Peter Kampion and John Wexler.

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*Wright-Patterson AF Base,*

# PROGRAM LISTING

~~VOLUME IV~~

## ~~1.0 PROGRAM LISTING~~

### ~~1.1 Introduction~~

This <sup>volume</sup> ~~section~~ contains the program listing for the two versions (one with, and one without, variable precision) as available for the CYBER 74.

Note that all '\$'s in variable names had to be replaced by '9's.

~~1.2~~ Version with Variable Precision (VUMSIM) - pg 2

~~1.3~~ Version without Variable Precision (NUMSIM) - pg





```

001245 IF (TIME-70.0) WRITE(6,694) NSOTIM,NSOINC
001250 694 FORMAT('HIGH SPEED STRAPDOWN NORMALIZATIONS WILL START',
001255 1 ' AT TIME ',G11.5,' AND MAXIMUM FREQ ',G11.5,' SECONDS')
001260 IF (TIME-70.0) WRITE(6,693) PSMAX,DPSMAX,((GAINS(I),I=
001265 1,10)
001270 693 FORMAT('ATTITUDE FILTER TOLERANCES: PSMAX=',G11.5,
001275 1 ' DPSMAX=',G11.5,' FIXED GAINS(COLUMNWISE)='
001280 2,4)MAX,G11.5),PS,3)X,G11.5),5X,'(X,G11.5)/')
001285 CALL VPINT
001290 WRITE(6,692) SOR2TH,SIN2TH,COS2TH,ATNPH,EX20L,FRAC1L,ROUND
001295 692 FORMAT('THIS VERSION HAS VARIABLE PRECISION, SORPTH=',I2,
001300 1 ' SINPTH=',I2,' COSPTH=',I2,' ATNPTH=',I2/145,'EXPOL=',I2,
001305 2 ' FRAC1L=',I2,' ROUND=',I2)
001310 GO TO (991,992,993),IMUTYP
001315 991 CALL LLINIT
001320 992 GO TO 422
001325 992 CALL SSINTY
001330 993 GO TO 420
001335 993 CALL SDINIT
001340 993 GO TO 420
001345 1 CONTINUE
001350 GO TO 110,100,200,1,IMUTYP
001355 C
001360 C THIS LOOP PERFORMS INPUT, IMU MODELING, AND ATTITUDE
001365 C CALCULATIONS WHEN LOCAL-LEVEL, HANDED-AZIMUTH (LLWA)
001370 C PLATFORM STABILIZATION IS SELECTED
001375 C
001380 10 GO TO 11,1,1,IPNAV
001385 11 CALL INREC
001390 11 IF (TIME-50.0) GO TO 505
001395 11 IF (TIME-51.0) GO TO 520
001400 11 CALL LLING
001405 11 IF (TIME-52.0) STOP,AREA 31 GO TO 20
001410 11 GO TO 13 K=13
001415 13 SFATP(K)=SF9T(K)
001420 13 GO TO 11
001425 20 PREP=TIME
001430 25 CALL CHINTG
001435 25 CALL LLATUD
001440 25 CALL LLALT
001445 25 IF (1-EO) IPNAV1 CALL INRNAV
001450 25 CALL ATUDE
001455 25 IF (MOD(I,IFREQ) .EQ. 0) CALL ATTFTL
001460 25 FILTER THE ATTITUDE DATA IF IT IS TIME
001465 30 CONTINUE
001470 30 GO TO 400
001475 C
001480 C THIS LOOP PERFORMS INPUT, IMU MODELING, AND ATTITUDE
001485 C CALCULATIONS WHEN SPACE STABLE PLATFORM STABILIZATION IS
001490 C SELECTED
001495 C
001500 100 GO TO 11,1,1,IPNAV
001505 100 IF (1-EO) IPNAV1 CALL INRNAV
001510 100 CALL INREC
001515 101 CALL INREC
001520 101 IF (TIME-50.0) GO TO 505
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001720 C THIS LOOP PERFORMS INPUT, IMU MODELING, AND ATTITUDE
001725 C CALCULATIONS WHEN SPACE STABLE PLATFORM STABILIZATION IS
001730 C SELECTED
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001910 25 CALL CHINTG
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001920 25 CALL LLALT
001925 25 IF (1-EO) IPNAV1 CALL INRNAV
001930 25 CALL ATUDE
001935 25 IF (MOD(I,IFREQ) .EQ. 0) CALL ATTFTL
001940 25 FILTER THE ATTITUDE DATA IF IT IS TIME
001945 30 CONTINUE
001950 30 GO TO 400
001955 C
001960 C THIS LOOP PERFORMS INPUT, IMU MODELING, AND ATTITUDE
001965 C CALCULATIONS WHEN SPACE STABLE PLATFORM STABILIZATION IS
001970 C SELECTED
001975 C
001980 100 GO TO 11,1,1,IPNAV
001985 100 IF (1-EO) IPNAV1 CALL INRNAV
001990 100 CALL INREC
001995 101 CALL INREC
002000 101 IF (TIME-50.0) GO TO 505
002005 101 IF (TIME-51.0) STOP,AREA 31 GO TO 20
002010 101 GO TO 13 K=13
002015 13 SFATP(K)=SF9T(K)
002020 13 GO TO 11
002025 20 PREP=TIME
002030 25 CALL CHINTG
002035 25 CALL LLATUD
002040 25 CALL LLALT
002045 25 IF (1-EO) IPNAV1 CALL INRNAV
002050 25 CALL ATUDE
002055 25 IF (MOD(I,IFREQ) .EQ. 0) CALL ATTFTL
002060 25 FILTER THE ATTITUDE DATA IF IT IS TIME
002065 30 CONTINUE
002070 30 GO TO 400
002075 C
002080 C THIS LOOP PERFORMS INPUT, IMU MODELING, AND ATTITUDE
002085 C CALCULATIONS WHEN SPACE STABLE PLATFORM STABILIZATION IS
002090 C SELECTED
002095 C
002100 100 GO TO 11,1,1,IPNAV
002105 100 IF (1-EO) IPNAV1 CALL INRNAV
002110 100 CALL INREC
002115 101 CALL INREC
002120 101 IF (TIME-50.0) GO TO 505
002125 101 IF (TIME-51.0) STOP,AREA 31 GO TO 20
002130 101 GO TO 13 K=13
002135 13 SFATP(K)=SF9T(K)
002140 13 GO TO 11
002145 20 PREP=TIME
002150 25 CALL CHINTG
002155 25 CALL LLATUD
002160 25 CALL LLALT
002165 25 IF (1-EO) IPNAV1 CALL INRNAV
002170 25 CALL ATUDE
002175 25 IF (MOD(I,IFREQ) .EQ. 0) CALL ATTFTL
002180 25 FILTER THE ATTITUDE DATA IF IT IS TIME
002185 30 CONTINUE
002190 30 GO TO 400
002195 C
002200 C THIS LOOP PERFORMS INPUT, IMU MODELING, AND ATTITUDE
002205 C CALCULATIONS WHEN SPACE STABLE PLATFORM STABILIZATION IS
002210 C SELECTED
002215 C
002220 100 GO TO 11,1,1,IPNAV
002225 100 IF (1-EO) IPNAV1 CALL INRNAV
002230 100 CALL INREC
002235 101 CALL INREC
002240 101 IF (TIME-50.0) GO TO 505
002245 101 IF (TIME-51.0) STOP,AREA 31 GO TO 20
002250 101 GO TO 13 K=13
002255 13 SFATP(K)=SF9T(K)
002260 13 GO TO 11
002265 20 PREP=TIME
002270 25 CALL CHINTG
002275 25 CALL LLATUD
002280 25 CALL LLALT
002285 25 IF (1-EO) IPNAV1 CALL INRNAV
002290 25 CALL ATUDE
002295 25 IF (MOD(I,IFREQ) .EQ. 0) CALL ATTFTL
002300 25 FILTER THE ATTITUDE DATA IF IT IS TIME
002305 30 CONTINUE
002310 30 GO TO 400
002315 C
002320 C THIS LOOP PERFORMS INPUT, IMU MODELING, AND ATTITUDE
002325 C CALCULATIONS WHEN SPACE STABLE PLATFORM STABILIZATION IS
002330 C SELECTED
002335 C
002340 100 GO TO 11,1,1,IPNAV
002345 100 IF (1-EO) IPNAV1 CALL INRNAV
002350 100 CALL INREC
002355 101 CALL INREC
002360 101 IF (TIME-50.0) GO TO 505
0023
```

```
CALL SSTMTG
IF (TIME - NE, IPREV, .OR. ISTOP, .NE. 0) GO TO 120
  GO TO 119 K=1,3
  119 SECTRAK=SECTRAK
  GO TO 101
  120 IPREV=TIME
  125 CALL CMINTG
  CALL SSATUT
  IF (I, EQ, ITHNAV) CALL SSTFPH
  IF (I, EQ, ITHNAV) CALL INRNAV
  CALL SSATT
  CALL ATUDE
  IF (MOD(I, ITHFIL), EQ, 0) CALL ATTFL
  185 C FILER THE ALTITUDE DATA IF IT IS TIME
  130 CONTINUE
  GO TO 400
  C
  C THIS LOOP PERFORMS INPUT, IMU MODELING, ATTITUDE, AND
  C VELOCITY SUMMING CALCULATIONS WHEN STAP-ONNN TMO
  C STABILIZATION IS SELECTED
  200 DO 210 I=1, ITHNAV
    205 J=1, ITHATT
    201 CALL IMPEG
    IF (ISTOP, EQ, 10) GO TO 505
    IF (TIME - CI, STOP) GO TO 520
    CALL SINTG
    IF (TIME - NE, IPREV, .OR. ISTOP, .NE. 0) GO TO 220
    200 210 K=1,3
    219 SECTRAK=SECTRAK
    GO TO 201
    220 IPREV=TIME
    225 CALL CMINTG
    CALL SSALUD
    CALL SSTMTG
    IF (I, EQ, ITHNAV) CALL HSINT2
    IF (I, EQ, ITHNAV) CALL INRNAV
    CALL ATUDE
    IF (MOD(I, ITHFIL), EQ, 0) CALL ATTFL
    FILER THE ALTITUDE DATA IE IT IS TIME
    230 CONTINUE
    C
    C THIS PATH IS COMMON TO ALL CONFIGURATIONS -- PERFORMS
    C CONTROL AND OUTPUT FUNCTIONS
    400 CONTINUE
    420 IF (TIME - LI, PTIME, .AND. TIME - LT, PLTIME) GO TO 500
    CALL OUTUNI
    IF (TIME - LT, PTIME) GO TO 440
    CALL PRINTG
    PTIME = TIME + PINT
    IF (TIME - LI, PLTIME) GO TO 500
    440 CALL PLTAP
    PLTIME = TIME + PLOTH
    500 IF (ISTOP, LT, ITHPLM) GO TO 1
    505 WPTIC(6,510) ISTOP, ITHPLM
    510 FORMAT (2X, "***** SIMULATION TERMINATED: ERROR SEVERITY OF "
```



```

1      .12.001 ERROR LIMIT IS ".12"
230      STOP
520 WRITE (6,521) TIME,STOP
521 FORMAT (1/2X,"*****",1/2X,"TRAJECTORY TIME OF ",G14.8,
1      - " PAGES REQUESTED STOP TIME OF ",G14.8,
2      - " SIMULATION TERMINATED.")
235      STOP
      END
    
```

CARD NO. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

124 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTE GO TO STATEMENT.

125 I AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTE GO TO STATEMENT.

SYMBOLIC REFERENCE MAP (P=1)

ENTRY POINTS  
12256 VUMSIN

VARIABLES	SN	TYPE	DECLARATION	1217	ALFAC	REAL	PROFSE
1222	ALF9T	REAL	TRAJIN	75	ALPHA	REAL	NAV
1222	ALTO	REAL	PROFGE	0	ALUANT	REAL	INPUTS
103	APESID	REAL	IMUDAT	0	ATJTH	INTEGER	ATJTH
44	R	REAL	APRAY	27	CALF	REAL	NAV
24	CALF9T	REAL	NAV	22	CLAT9T	REAL	TRAJIN
13562	CLOCK	REAL	TRAJIN	0	COSPTH	INTEGER	COSPTH
17	CV01	REAL	INPUTS	11	CV02	REAL	INPUTS
12	CV03	REAL	INPUTS	165	C0000	REAL	NAV
0	C00020	REAL	NAV	154	C0019	REAL	NAV
177	C005	REAL	NAV	45	C1000	REAL	IMUDAT
56	C1092P	REAL	IMUDAT	20	C2005	REAL	IMUDAT
67	C2095T	REAL	IMUDAT	31	C0015	REAL	IMUDAT
22	C9040	REAL	NAV	54	DALE	REAL	OUTPUT
153	DELTA	REAL	NAV	109	DELTA	REAL	NAV
123	DELTA	REAL	NAV	16	DELTA	REAL	TRAJIN
47	DELTA	REAL	OUTPUT	43	DELTA	REAL	OUTPUT
53	DELTA	REAL	OUTPUT	53	DELTA	REAL	OUTPUT
55	DELTA	REAL	INPUTS	0	DELTA	REAL	PROFGE
44	DELTA	REAL	OUTPUT	217	DELTA	REAL	NAV
4	DELTA	REAL	IMUDAT	14	DELTA	REAL	NAV
62	DELTA	REAL	PROFGE	6	DELTA	REAL	UNIVSL
101	DELTA	REAL	NAV	5	DELTA	REAL	IMUDAT
5	DELTA	REAL	TRAJIN	1	DELTA	INTEGER	DELTA
112	DELTA	REAL	NAV	0	DELTA	INTEGER	DELTA
225	DELTA	REAL	NAV	71	DELTA	REAL	NAV
74	DELTA	REAL	NAV	4	DELTA	REAL	TRAJIN
144	DELTA	REAL	PROFGE	226	DELTA	REAL	PROFGE
117	DELTA	REAL	PROFGE	1	DELTA	REAL	UNIVSL

VARIABLES	SN	TYPE	RELLOCATION	14	HSOITH	REAL	INTEGR	INPUTS
15 HSOINC	REAL	ARRAY	INPUTS	14	HSOITH	REAL	INTEGR	INPUTS
137 HV92P	REAL	ARRAY	NAV	13563	J	INTEGR	INTEGR	NAV
7 ICHCYL	INTEGR	CONTROL	CONTROL	10	ICMCPV	INTEGR	INTEGR	NAV
22 ICHCYL	INTEGR	INPUTS	INPUTS	263	IGATVP	INTEGR	INTEGR	NAV
21 IMUTYP	INTEGR	CONTROL	CONTROL	20	INCOR	INTEGR	INTEGR	NAV
5 INFI	INTEGR	CONTROL	CONTROL	61	ICMCPV	INTEGR	INTEGR	NAV
65 IPAGF	INTEGR	OUTPUT	OUTPUT	23	TPC	INTEGR	INTEGR	NAV
56 IPLIM	INTEGR	OUTPUT	OUTPUT	1225	TPLOT	INTEGR	INTEGR	NAV
67 IPINT	INTEGR	OUTPUT	OUTPUT	1223	TPMNT	INTEGR	INTEGR	NAV
1226 IPLOB	INTEGR	PROCEGE	PROCEGE	1224	IRITE	INTEGR	INTEGR	NAV
6	INTEGR	CONTROL	CONTROL	0	ITRIFL	INTEGR	INTEGR	NAV
17 ITRATT	INTEGR	INPUTS	INPUTS	67	ITRIFL	INTEGR	INTEGR	NAV
16 ITRMAV	INTEGR	INPUTS	INPUTS	13564	J	INTEGR	INTEGR	NAV
13565 K	INTEGR	INPUTS	INPUTS	13564	J	INTEGR	INTEGR	NAV
1220 LATO	REAL	PROCEGE	PROCEGE	106	LAT	REAL	REAL	NAV
1230 LLMECH	INTEGR	PROCEGE	PROCEGE	106	LONG	REAL	REAL	NAV
20 LONGO	REAL	TRAJIN	TRAJIN	2	LONGOT	REAL	REAL	NAV
1221 LONO	REAL	PROCEGE	PROCEGE	372	MODE	INTEGR	INTEGR	NAV
454 NPATH	INTEGR	PROCEGE	PROCEGE	1227	NSCY	INTEGR	INTEGR	NAV
31 OALF	REAL	OUTPUT	OUTPUT	26	OALFOT	REAL	REAL	NAV
213 OXX	REAL	NAV	NAV	214	OXX	REAL	REAL	NAV
215 ODZ	REAL	NAV	NAV	25	OTIA	REAL	REAL	NAV
32 OFTAGT	REAL	ARRAY	ARRAY	222	OFILTR	REAL	REAL	NAV
176 OHG	REAL	NAV	NAV	27	OLAT	REAL	REAL	NAV
24 OLAT9T	REAL	OUTPUT	OUTPUT	30	OLONG	REAL	REAL	NAV
25 OLONGT	REAL	OUTPUT	OUTPUT	0	OTIME	REAL	REAL	NAV
142 OV92P	REAL	ARRAY	ARRAY	535	PAGE	REAL	REAL	NAV
1215 PHEADO	REAL	PROCEGE	PROCEGE	3	PI	REAL	REAL	NAV
620 PITCH	REAL	PROCEGE	PROCEGE	5	PLATM	REAL	REAL	NAV
2 PLTIME	REAL	CONTROL	CONTROL	1215	PITCH	REAL	REAL	NAV
6 PRNT	REAL	INPUTS	INPUTS	1	PTIME	REAL	REAL	NAV
216 Q2P95	REAL	NAV	NAV	10	PADPER	REAL	REAL	NAV
0 QESIO	REAL	IMUDAT	IMUDAT	11	PE50	REAL	REAL	NAV
232 RESTAR	INTEGR	PROCEGE	PROCEGE	17	RUC	REAL	REAL	NAV
1212 ROLRAY	REAL	PROCEGE	PROCEGE	9	ROUND	REAL	REAL	NAV
7 RPE	REAL	UNVCEL	UNVCEL	65	PCMAX	REAL	REAL	NAV
7 RSTIME	REAL	CONTROL	CONTROL	7	PCPT	REAL	REAL	NAV
23 ROLRAY	REAL	UNVCEL	UNVCEL	76	SALF	REAL	REAL	NAV
0 SINTH	INTEGR	TRAJIN	TRAJIN	764	SFGLNT	REAL	REAL	NAV
63 SINTH	INTEGR	TRAJIN	TRAJIN	13	SFSTP	REAL	REAL	NAV
0 SINTH	INTEGR	SINTH	SINTH	21	SLATOT	REAL	REAL	NAV
63 SINTH	INTEGR	SINTH	SINTH	62	SSXG	REAL	REAL	NAV
3 STAPT	REAL	INPUTS	INPUTS	54	SS70	REAL	REAL	NAV
145 S2PHI	REAL	INPUTS	INPUTS	4	STDP	REAL	REAL	NAV
63 SINTH	INTEGR	NAV	NAV	1046	TACC	REAL	REAL	NAV
60 SINTH	INTEGR	NAV	NAV	55	INTERI	REAL	REAL	NAV
12 TIMED	REAL	ARRAY	ARRAY	0	TIME	REAL	REAL	NAV
13 TOLJRK	REAL	TRAJIN	TRAJIN	13561	TODAY	REAL	REAL	NAV
1213 TOLJRK	REAL	INPUTS	INPUTS	4	TODAY	REAL	REAL	NAV
1213 TOLJRK	REAL	PROCEGE	PROCEGE	42	TRESID	REAL	REAL	NAV
1214 VMO	REAL	NAV	NAV	1	TIPM	REAL	REAL	NAV
1214 VMO	REAL	NAV	NAV	2	VMOANT	REAL	REAL	NAV
1214 VMO	REAL	NAV	NAV	13	VOT	REAL	REAL	NAV
1214 VMO	REAL	NAV	NAV	11	V2P	REAL	REAL	NAV
1214 VMO	REAL	NAV	NAV	7	WERT	REAL	REAL	NAV
1214 VMO	REAL	NAV	NAV	65	WY	REAL	REAL	NAV
1214 VMO	REAL	NAV	NAV	152	WY	REAL	REAL	NAV

VARIABLES SN TYPE RELOCATION 146 XS2PMT REAL NAV  
 124 XSALF REAL 126 XGP92P REAL ARRAY NAV  
 147 XVS2P REAL

FILE NAMES MODE 2041 OUTPUT 6143 TAPE20 UNFMT 10204 TAPE20  
 0 INPUT 4102 TAPE6 FMT  
 0 TAPES

EXTERNALS IYPE A2GS  
 ATTFIL 0 ATUOF 0  
 CHINTG 0 HSINIG 0  
 HSTN2 0 INDEC 0  
 TURNV 0 LLAY 0  
 LLATUN 0 LLINT 0  
 LLINTG 0 AUTOMI 0  
 PLTAPP 0 PINT 0  
 SOATUN 0 SCHIT 0  
 SDINTG 0 SSATT 0  
 SSATUN 0 SSINT 0  
 SSINTG 0 SSIFOM 0  
 VPINIT 0

INLINE FUNCTIONS IYPE A2GS  
 MOD INTEGER 2 INTRN

MANIFESTS  
 SINPAP

STATEMENT LABELS			
STATEMENT	INDEX	LENGTH	PROPERTIES
12400 1	13210 5	FMT	12410 10
12412 11	0 19		12413 20
3 25	0 30		12457 100
12451 101	0 119		12502 120
0 125	0 130		12511 200
12531 201	0 219		12554 220
0 225	0 230		12613 400
12603 420	12617 440		12622 500
12625 505	13524 510	FMT	12670 520
12643 521	13472 602	FMT	13446 601
13424 604	13376 605	FMT	13361 606
13462 607	13137 608	FMT	13004 609
12372 991	12174 992		12376 993
13217 990		FMT	

LOADS LABEL			
LOADS LABEL	INDEX	LENGTH	PROPERTIES
12274	77 77	328	EXT REFS
12611 30	142 160	401	EXT REFS
12612 25	143 163	278	EXT REFS
12626 10	149 150	48	EXT REFS
12640 130	167 166	518	EXT REFS
12651 125	168 178	270	EXT REFS
12675 119	174 175	49	EXT REFS
12682 230	193 212	518	EXT REFS
12683 230	194 204	278	EXT REFS
12647 214	200 201	40	EXT REFS

PROGRAM NAME: 7472A OPER 12AGE

FIN 4.59240E

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PAGE

5

COMMON BLOCKS LENGTH  
 CONTROL 9  
 INPUTS 56  
 INOUT 67  
 JAV 192  
 OUTPUT 48  
 UNVRSL 10  
 TOAJIN 21  
 SHPTH 1  
 STPTH 1  
 COSPTH 1  
 ATHTH 1  
 PRFCIS 2  
 VPTH 1  
 PROFGE 655

STATISTICS

PROGRAM LENGTH 13209 720  
 BUFFER LENGTH 122462 5246  
 CM LABELED COMMON LENGTH 20519 1065

1-2  
10







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ETN-4.5-R406

BLOCK DATA BLKDAT 74774 OPI=0 TRACE

VARIABLES	SN	TYPE	RELLOCATION	1	HPT	REAL	UNIVSL
4 HP		REAL	TRAJIN	14	HSOTIM	REAL	INPUTS
15 HSOINC		REAL		7	ICHCYL	INTEGER	CONTROL
17 HVQ2P		REAL	ARRAY	22	IERLIN	INTEGER	INPUTS
10 HMOCP		INTEGER	COMBIL	21	IMUTYP	INTEGER	INPUTS
263 IGATVP		INTEGER	NAV	5	IMUTYP	INTEGER	CONTROL
20 INGOR		INTEGER	INPUTS	55	IPAGF	INTEGER	OUTPUT
21 INOPNEP		INTEGER	INPUTS	56	ISOLIM	INTEGER	CONTROL
23 IPC		INTEGER	ARRAY	6	ISOTOP	INTEGER	OUTPUT
57 IPDINT		INTEGER	OUTPUT	17	ITRAIT	INTEGER	CONTROL
0 IITILE		INTEGER	OUTPUT	15	ITRAIT	INTEGER	INPUTS
47 ITRFIL		INTEGER	INPUTS	1	ITRAIT	REAL	INPUTS
105 LAT		REAL	NAV	20	LAT9T	REAL	TRAJIN
104 LONG		REAL	NAV	0	LONG0	REAL	TRAJTH
2 LONGGT		REAL	TRAJIN	26	NAVCCY	REAL	NAV
11 OALF		REAL	OUTPUT	24	OALF9T	REAL	OUTPUT
213 ODX		REAL	NAV	214	ODV	REAL	NAV
215 OGT		REAL	NAV	15	ODV	REAL	OUTPUT
12 OETAQ		REAL	ARRAY	222	OFILT	REAL	NAV
176 OHR		REAL	NAV	27	OFILT	REAL	OUTPUT
24 OLAT9T		REAL	OUTPUT	33	OLONG	REAL	OUTPUT
25 OLONGT		REAL	OUTPUT	0	OTIME	REAL	CONTROL
24 OUDAT		REAL	ARRAY	142	OV32P	REAL	NAV
0 OT		REAL	CONTROL	5	PLOTIM	REAL	INPUTS
2 PLTIME		REAL	UNIVSL	0	PONT	REAL	TRAJTH
2 PONT		REAL	INPUTS	1	PONT	REAL	CONTROL
216 Q2P35		REAL	ARRAY	13	RANDER	REAL	UNIVSL
0 RESID		REAL	ARRAY	11	RE30	REAL	UNIVSL
17 RH0		REAL	ARRAY	0	RE30	INTEGER	VPPH
1 PPO		REAL	NAV	65	RE30	REAL	INPUTS
1 RSTIME		REAL	UNIVSL	7	RE30	REAL	NAV
2 R0		REAL	CONTROL	76	SELF	REAL	TRAJTH
23 SALT9T		REAL	TRAJIN	13	SE9T	REAL	SE9TH
15 SE9TP		REAL	THUDAT	0	SE9TH	INTEGER	INPUTS
21 SLAT9T		REAL	TRAJIN	0	SE9TH	REAL	INPUTS
62 SSX0		REAL	INPUTS	63	SSV0	REAL	NAV
64 SSZ0		REAL	INPUTS	145	STAPT	REAL	NAV
4 STOP		REAL	INPUTS	55	STAPHI	REAL	NAV
67 TINCOR		REAL	NAV	0	THITEOT	REAL	NAV
60 THITPO		REAL	NAV	0	TIME	REAL	TRAJIN
17 TIME2		REAL	TRAJIN	11	TOLJCK	REAL	INPUTS
4 TPOFV		REAL	CONTROL	1	TOUANT	REAL	NAV
42 TPFSTD		REAL	IMUDAT	104	VHMO	REAL	TRAJIN
2 VQUANT		REAL	INPUTS	10	V3T	REAL	NAV
107 V92		REAL	NAV	11	V92P	REAL	NAV
40 V92T		REAL	OUTPUT	7	WE2T	REAL	UNIVSL
12 WT		REAL	THUDAT	56	WNV	REAL	NAV
125 XCALF		REAL	NAV	152	W4	REAL	NAV
124 XSALF		REAL	NAV	146	XS2PHI	REAL	NAV
147 XV92P		REAL	ARRAY	126	X9P92P	REAL	NAV

COMMON BLOCKS	LENGTH
CONTROL	9
IMUDAT	67
INPUTS	56
NAV	142
OUTPUT	48
P60AV	7



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FIN 4.549406

74774 DRI=0 IRAGE

BLOCK DATA BLKDAI

COMMON BLOCKS	LENGTH
TPAJIN	21
UKVPSL	10
SCPTTH	1
SINDTH	1
COSPTH	1
ATHPTH	1
OPPCIS	2
VPPTH	1

STATISTICS

PROGRAM LENGTH	09	0
CM LABELED COMMON LENGTH	6278	407

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1      SUBROUTINE INREC
      INREC -- TRAJECTORY INPUT ROUTINE

5      IMPLICIT REAL(A-H), REAL(L-Z)
      COMMON /COMTRL/ INIT, PTIME,
1      IPEV, ISIP,
      COMMON /INPUTS/ QUANT,
1      STOP, CUD2, CUD3, IOLSK,
2      ITPAV, ITRAT, IACO, SSX1,
3      IPC130, IOPNLF, IT2FIL
4      RSMAX,
      COMMON /NAV/ GCP42P(3,3), V92P(3,3),
1      GCPH0(3,3), A(3,3), R(3,3),
2      IHC02(3,3), MXV(3,3), G92P(3,3),
3      SOLF, CALF,
4      LAT, LCHG,
5      XSOLF, YCALF,
6      SZPHI, XS2PHI,
7      C0910(3,3), C0P90(3,3), OM3,
8      GDX, GDY,
9      GAIN5(3,10), TGAINP(3)
      COMMON /TRAJIN/ TIME, LAIS,
1      HQ, FTAGT(3), V9T(3),
2      TIME2, LONG2, SLAT9T,
3      CALF9T

15     DIMENSION PRQAT(14), PPR(14)
      EQUIVALENCE (PRQAT, TIME)
      EQUIVALENCE (PPR, TIME)

      IF (INIT.NE.0) GO TO 211

      C      INITIALIZATION PATH
      C
      C      4. READ(20) (PRQAT(I), I=1,14)
      IF (EOF(20).NE.0) GO TO 300
      IF (TIME.LT. START) GO TO 4
      C
      C      READ SECOND RECORD TO GET TRAJECTORY SAMPLE PERIOD
      C
      C      2. READ(20) (PRQ(I), I=1,14)
      IF (EOF(20).NE.0) GO TO 300
      DELT = TIME - TIME - 1.E-9
      TIME1 = 1./DELTS
      DELISE1 = 1/TIME1
      C
      C      ENSURE ATTITUDE CYCLE PERIOD IS MULTIPLE OF TRAJECTORY
      C      SAMPLE PERIOD
      C
      IF (ITPATT.NE.0) GO TO 60
      DELTA = 1./ITPATT
      ITPATT = DELTA/DELTS
      IF (ITPATT.LT. 1) GO TO 50
      IF (ITPATT*DELTS.FO. DELTA) GO TO 70
      C

```

15  
16

```

50 WRITE(6,55) OFLT,DELTA
55 FORMAT(12X,"***** TIMING ERROR: DESIRED ATUD PERIOD IS ",G16.10,U14.80
1 1 " SEC: TRAJECTORY SAMPLE PERIOD IS ",G16.10/2X,
2 "MUST BE EVEN MULTIPLES ERROR LEVEL 5"/)
1STOP = 5
60 DELTA = DELTA
ITRATT = 1
C
C ENSURE NAVIGATION CYCLE PERIOD IS MULTIPLE OF ATTITUDE
CYCLE PERIOD
C
70 IF (ITRNAV .LE. 0) GO TO 30
OFLT = 1./ITRNAV
ITRNAV = DELTA/DELTA
IF (ITRNAV .LT. 1) GO TO 20
IF (ITRNAV*DELTA .EQ. DELTA) GO TO 40
20 WRITE(6,56) OFLT,DELTA
25 FORMAT(12X,"***** TIMING ERROR: DESIRED NAV PERIOD IS ",G16.10,
1 " SEC: DESIRED ATTITUDE PERIOD IS ",G16.10/2X,
2 "MUST BE EVEN MULTIPLES ERROR LEVEL 5"/)
1STOP = 5
30 DELTA = DELTA
ITRNAV = 1
40 ITRP1 = 1./OFLT
ITRP2 = 1./DELTA
ITRP3 = 1./DELTA
ITRP4 = ITRNAV*ITRATT
IF (ITRP1*ITRP2 .EQ. 1) GO TO 410
IF (ITRP1*ITRP3 .EQ. 1) GO TO 410
ITRP5 = 1./ITRP1
ITRFILE = ITRP4/DELTA
IF (ITRFILE .LT. 1) GO TO 420
IF (ITRFILE*DELTA .EQ. TEMP .AND. NOT(ITRNAV,ITRFILE) .EQ. 0)
1 GO TO 430
420 WRITE(6,421)
421 FORMAT(12X,"***** TIMING ERROR: EITHER ITRFILE IS NOT A1 "
1 "INTEGRAL NUMBER OF ATTITUDE CYCLES, OR",/25X,"ITRNAV "
2 "IS NOT AN INTEGRAL MULTIPLE OF ITRATT ERROR LEVEL 5"/)
1STOP = 5
400 ITRP5 = DELTA
ITRFILE = 1
430 CONTINUE
WRITE(6,110) ITRP1,DELTA
WRITE(6,115) ITRP2,DELTA,ITRATT
WRITE(6,120) ITRP3,DELTA,ITRNAV
IF (ITRP1*ITRP2 .EQ. 1) GO TO 250
ITRPP5 = 1./ITRP5
WRITE(6,567) ITRP5,ITRP5
567 FORMAT(12X,"***** FILTER CYCLE RATE",/2X,ITP5," CPS FILTER PERIOD"
1 16X,F11.8," SEC")
GO TO 250
110 FORMAT(12X,"TIMING PARAMETERS",/2X,"TRAJECTORY SAMPLE RATE "
1 1X," CPS TRAJECTORY PERIOD ",F11.8," SEC")
115 FORMAT(12X,"ATTITUDE CYCLE RATE " 13X," CPS "
1 "ATTITUDE PERIOD ",F11.8," SEC TRAJ SAMPLE RATE CYCLE "
2 11X)
120 FORMAT(12X,"NAV CYCLE RATE",/2X,ITP5," CPS NAV PERIOD",/2X,F11.8,"

```

16  
1-17

```

115 1 SEC TRAJ SAMP/NAV CYCLE ".13." ATT CYCLF/".
2 "NAV CYCLE ".13."
C
C NORMAL PATH
120 C
200 CONTINUE
IF (INIT.NE.1) GO TO 245.
00 240 I=1,14
240 READ(11) = PRD(I)
INIT = ?
GO TO 250
245 READ(20) (PRD(I),I=1,14)
IF (EOF(20).NE.0) GO TO 300
250 SLAT91= SINSLAT91)
GLAT91= COSSLAT91)
SALF91= SINSLAF91)
CALF91= COSSLAF91)
RETURN
C
C TAPE ERROR HANDLING
145 C
300 ISOP = 30
WRITE (6,301)
301 FORMAT (2X,"***** INPUT TAPE READ ERROR: ERROR LFUFL 10**")
RETURN
END

```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
1 INPEC

VARIABLES	SN	TYPE	RELOCATION	3	ALF91	PFAL	TRAJIN
33 A	REAL	ARRAY	NAV	0	ARQUANT	REAL	INPUTS
75 ALPHA	REAL	ARRAY	NAV	77	CALF	REAL	NAV
44 J	REAL	ARRAY	NAV	22	CLAT91	REAL	TRAJIN
24 CALF91	REAL	TRAJIN	INPUTS	11	CW91	REAL	INPUTS
10 CVD1	REAL	INPUTS	155	C990	REAL	ARRAY	NAV
12 CVD3	REAL	INPUTS	154	C990	REAL	ARRAY	NAV
0 CDP92P	REAL	ARRAY	NAV	22	C990	REAL	NAV
177 C995	REAL	ARRAY	NAV	180	DELTA	REAL	NAV
153 DELTA	REAL	NAV	NAV	15	DELTA	REAL	TRAJIN
123 DELTA	REAL	NAV	NAV	210	DV92P	REAL	NAV
66 DV92P	REAL	INPUTS	NAV	101	ETA	REAL	NAV
14 DV92P	REAL	ARRAY	NAV	112	FLAT91	REAL	NAV
5 ETAGT	REAL	ARRAY	NAV	71	C994	REAL	NAV
276 GATHS	REAL	ARRAY	NAV	4	H3	REAL	TRAJIN
74 H	REAL	NAV	NAV	14	HSOYTH	REAL	INPUTS
15 HSAT91	REAL	INPUTS	NAV	446	I	INTEGER	NAV
117 HV92P	REAL	ARRAY	NAV	10	T990	INTEGER	NAV
7 T990	INTEGER	CONTROL	NAV	261	ICAT91	INTEGER	NAV
22 T991	INTEGER	INPUTS	NAV				



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FIN. 4.508406

74724 OPI=0. IPAGE

LOOPS LABEL INDEX FROM-TO LENGTH PROPERTIES  
151 240 I 123 124 40 INSTACK

COMMON BLOCKS LENGTH

CONTROL 9  
INPUTS 56  
HAY 182  
TRAJIN 21

STATISTICS

PROGRAM LENGTH 4730 315

CW LABELED COMMON LENGTH 4148 263







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FIN 4.5+2406

SUBROUTINE OUTUNI 74774 OPT=0 IRAGE

VARIABLES SM TYPE RELOCATION  
126 XOP92P REAL ARRAY NAV

STATEMENT LABELS

0 10 0 50

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
21	10	I	39 42	108	OPT
53	50	I	53 56	108	OPT

COMMON BLOCKS	LENGTH
NAV	182
OUTPUT	48
UNVPSL	10
IFAJIN	21

STATISTICS

PROGRAM LENGTH	649	52
CM LABELED COMMON LENGTH	4059	261



```

IPRINT = IPRINT + 12
IF (IPRINT(25)...EQ...01..GO..10 2000
60 1950 I=1,1
DO 1250 J=1,1
1950 AT(J)=FILATT(I,J)/RANPER
WRITE(6,9160) ((A(I,J),I=1,3),J=1,3)
FORINT=IPRINT+5
65 9100 FORHAT ("1",2X,"IDEAL INS SIMULATOR",10X,20A4,1X,"PAGE ",I3//,14X,6064.30
"TRAJECTORY",12X,"SIMULATOR",12X,"DIFFERENCE")
9105 FORHAT (12X,"TIME",3(G18,12,3X))
9110 FORHAT (12X,"LATITUDE",3(G18,12,3X))
9115 FORHAT (12X,"LONGITUDE",3(G18,12,3X))
9120 FORHAT (12X,"ALPHA",3(G18,12,3X))
9125 FORHAT (12X,"ALTITUDE",3(G18,12,3X))
9130 FORHAT (12X,"VX (UP)",3(G18,12,3X))
9135 FORHAT (12X,"VY (EAST)",3(G18,12,3X))
9140 FORHAT (12X,"VZ (NORTH)",3(G18,12,3X))
9145 FORHAT (12X,"ROLL",3(G18,12,3X))
9150 FORHAT (12X,"PITCH",3(G18,12,3X))
9155 FORHAT (12X,"YAW",3(G18,12,3X))
9160 FORHAT (12X,"FLTRD ATTUM",8X,"ANGLE",15X,"DATE",17X,
1 "ACCEL",2X,"PIP/2X",20X,3(G18,12,3X),I3/
2 2X,"PITCH",3(G18,12,3X),I3/
3 2X,"YAW",3(G18,12,3X),J3 / )
2000 RETURN
END

```

SYMBOLIC REFERENCE MAP. (P=1)

ENTRY POINTS  
1 PRINT

VARIABLES	SN	TYPE	RELOCATION	ALF9T	REAL	TRAJIN
33 A	REAL	ARRAY	NAV	0	REAL	TRAJIN
75 ALPHA	REAL	ARRAY	NAV	77	REAL	TRAJIN
44 B	REAL	ARRAY	NAV	22	REAL	TRAJIN
24 CALF9T	REAL	ARRAY	NAV	11	REAL	TRAJIN
10 CV01	REAL	ARRAY	NAV	165	REAL	TRAJIN
12 CV03	REAL	ARRAY	NAV	154	REAL	TRAJIN
0 COP92P	REAL	ARRAY	NAV	22	REAL	TRAJIN
177 CG95	REAL	ARRAY	NAV	153	REAL	TRAJIN
54 DOLF	REAL	ARRAY	NAV	123	REAL	TRAJIN
100 DFLT	REAL	ARRAY	NAV	47	REAL	TRAJIN
16 DELTS	REAL	ARRAY	NAV	52	REAL	TRAJIN
43 DH	REAL	ARRAY	NAV	66	REAL	TRAJIN
53 DLONG	REAL	ARRAY	NAV	210	REAL	TRAJIN
44 DV	REAL	ARRAY	NAV	4	REAL	TRAJIN
14 DV92P	REAL	ARRAY	NAV	5	REAL	TRAJIN
4 CF90	REAL	ARRAY	NAV	5	REAL	TRAJIN
101 FTA	REAL	ARRAY	NAV	225	REAL	TRAJIN
112 FILATT	REAL	ARRAY	NAV	74	REAL	TRAJIN
71 G92P	REAL	ARRAY	NAV	1	REAL	TRAJIN
4 H	REAL	ARRAY	NAV		REAL	TRAJIN

VARIABLES	SN	TYPE	RELOCATION	14	HSOTIM	REAL	ARRAY	INPUTS
15 HWSOTHC	15	REAL	INPUTS	14	HSOTIM	REAL	ARRAY	INPUTS
137 HV92P	137	REAL	NAV	345	I	INTEGER	ARRAY	NAV
7 ICHCYP	7	INTEGER	CONTROL	10	ICHCYP	INTEGER	ARRAY	CONTROL
22 IFRILM	22	INTEGER	INPUTS	253	IGAINP	INTEGER	ARRAY	NAV
21 INDUTP	21	INTEGER	INPUTS	20	INDOP	INTEGER	ARRAY	INPUTS
5 INIT	5	INTEGER	CONTROL	51	INDHLP	INTEGER	ARRAY	INPUTS
55 IPAGE	55	INTEGER	OUTPUT	23	IPS	INTEGER	ARRAY	OUTPUT
56 IPLIM	56	INTEGER	OUTPUT	57	IPINT	INTEGER	ARRAY	OUTPUT
6 ISOPM	6	INTEGER	CONTROL	0	ITILE	INTEGER	ARRAY	OUTPUT
17 ITRATI	17	INTEGER	INPUTS	57	ITRFL	INTEGER	ARRAY	INPUTS
16 ITONAV	16	INTEGER	INPUTS	346	J	INTEGER	ARRAY	INPUTS
105 LAT	105	REAL	NAV	1	LAT9T	REAL	ARRAY	NAV
106 LONG	106	REAL	NAV	29	LONG9	REAL	ARRAY	NAV
2 LONG9T	2	REAL	TPAJIN	31	OLAF	REAL	ARRAY	NAV
26 GOLF9T	26	REAL	OUTPUT	213	OLX	REAL	ARRAY	NAV
214 QNY	214	REAL	NAV	215	QZ	REAL	ARRAY	NAV
35 OETA	35	REAL	OUTPUT	12	OT9T	REAL	ARRAY	OUTPUT
222 OFILTR	222	REAL	NAV	176	OH9	REAL	ARRAY	NAV
27 OLAT	27	REAL	OUTPUT	24	OLAT9T	REAL	ARRAY	OUTPUT
19 OLONG	19	REAL	OUTPUT	25	OLONGT	REAL	ARRAY	OUTPUT
6 OTIME	6	REAL	CONTROL	142	OV92P	REAL	ARRAY	NAV
0 PI	0	REAL	UNV9SL	5	PLOTIN	REAL	ARRAY	INPUTS
2 PLTIME	2	REAL	CONTROL	6	P9MT	REAL	ARRAY	INPUTS
1 PTIME	1	REAL	CONTROL	216	Q2905	REAL	ARRAY	NAV
10 RAPER	10	REAL	UNV9SL	11	PFSO	REAL	ARRAY	UNV9SL
17 RVD	17	REAL	NAV	3	P9J	REAL	ARRAY	CONTROL
65 RSMAX	65	REAL	INPUTS	3	PSTIME	REAL	ARRAY	UNV9SL
7 QSDPT	7	REAL	INPUTS	2	P9	REAL	ARRAY	TPAJIN
76 SALT	76	REAL	NAV	23	SALT9T	REAL	ARRAY	TPAJIN
17 SF9T	17	REAL	TPAJIN	21	SLAT9T	REAL	ARRAY	TPAJIN
62 SSX0	62	REAL	INPUTS	63	SSV0	REAL	ARRAY	TPAJIN
64 SZ0	64	REAL	INPUTS	3	ST9T	REAL	ARRAY	TPAJIN
4 ST0P	4	REAL	INPUTS	145	S9PHI	REAL	ARRAY	TPAJIN
57 THICOP	57	REAL	NAV	55	TINT9T	REAL	ARRAY	TPAJIN
60 THITRO	60	REAL	NAV	0	TIMF	REAL	ARRAY	TPAJIN
17 TIME0	17	REAL	TPAJIN	13	TOLJ9K	REAL	ARRAY	TPAJIN
4 TPOFV	4	REAL	CONTROL	1	TQUANT	REAL	ARRAY	TPAJIN
104 V9HP	104	REAL	NAV	2	VQUANT	REAL	ARRAY	TPAJIN
10 V9T	10	REAL	TPAJIN	107	V92	REAL	ARRAY	TPAJIN
11 V92P	11	REAL	NAV	40	V92T	REAL	ARRAY	TPAJIN
7 WFPT	7	REAL	UNV9SL	66	NXV	REAL	ARRAY	TPAJIN
125 XCALF	125	REAL	NAV	152	NH	REAL	ARRAY	TPAJIN
124 XSALF	124	REAL	NAV	146	X92PHI	REAL	ARRAY	TPAJIN
147 XV92P	147	REAL	NAV	126	V9992P	REAL	ARRAY	TPAJIN

FILE NAMES: MODE

TAPE6

STATEMENT LABELS

4 1900	13 1910	0 1950	0 1950
104 2000	222 9100	236 9105	236 9105
243 9110	247 9115	254 9120	254 9120
241 9125	264 9130	273 9135	273 9135
307 9140	305 9145	312 9150	312 9150
317 9155	324 9160		

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FIN 4.532006

SUBROUTINE PRINIR 74/74 OPT=0 TRACE

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
45	1950	* I	60 62	120	NOT INNER
46	1950	* J	61 62	58	INSTACK
61		* J	63 63	209	FVI PFFS NOT INNER
52		* I	63 63	118	EXT REFS

COMMON BLOCKS	LENGTH
CONTROL	9
NAV	182
OUTPUT	48
TPAJIN	21
INPUTS	56
UNVPSL	10

# STATISTICS

PROGRAM LENGTH	3478	231
CM. LABELED COMMON LENGTH	5063	326

26  
1-27

## SUBROUTINE PLTAP

1 C SUBROUTINE TO CREATE A PLOT TAPE. RECORD FORMAT IS GIVEN  
BELOW.

5 C  
C TIME (ISEC)  
C LATITUDE (DEG)  
C LONGITUDE (DEG)  
C HANDLER ANGLE (DEG)  
C ALTITUDE (FT)  
10 C U<sup>2</sup> VELOCITY (FT/SEC)  
C EAST VELOCITY (FT/SEC)  
C NORTH VELOCITY (FT/SEC)  
C ROLL ANGLE (DEG)  
15 C PITCH ANGLE (DEG)  
C YAW ANGLE (DEG)

20 C ALL ITEMS ARE DOUBLE PRECISION.

IMPLICIT REAL(A-H,L-Z)  
COMMON /CONTROL/ OTIME.

1 IPRCV, INIT, ISTOP, PLTIME, RSTIME,  
COMMON /OUTPUT/ ITITLE(20), OLAT91, ICMCYP,  
2 OLAT, OLONG, OALF, OETA91(3), OETA(3),  
3 V921(3), DH, DV(3), DELTA(3), DLAT,  
4 IRAGE, IBLIN, IPRINT, LONG91, ALF91,  
COMMON /TRAJIN/ TIME, LAT91, LONG91, SF91(3),  
1 H3, EIA91(3), V31(3), DELIS,  
2 TIME0, LONG0, SLAT91, SALF91,  
3 CALF91

INITIAL PASS WRITES TITLE AS FIRST RECORD.

35 C  
C IE (INIT .NE. 0) GO TO 10  
WRITE(30) (ITITLE(I), I=1, 20)  
10 WRITE(30) TIME, DLAT, DLONG, DALF, DH, (DV(I), I=1, 3),  
(OETA(I), I=1, 3)

1 RETURN

90 ISTOP = 10

WRITE(6, 91)

91 FORMAT (/2X, '\*\*\*\*\* PLOT TAPE WRITE ERROR: ERROR LEVEL 10-')/

1 RETURN

END

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS

1 PLTAP

006620  
006630  
006640  
006650  
006660  
006670  
006680  
006690  
006700  
006710  
006720  
006730  
006740  
006750  
006760  
006770  
006780  
006790  
006800  
006810  
006820  
006830  
006840  
006850  
006860  
006870  
006880  
006890  
006900  
006910  
006920  
006930  
006940  
006950  
006960  
006970  
006980  
006990  
007000  
007010  
007020  
007030  
007040  
007050  
007060



```

1      SUBROUTINE 0001(J)
      C      OUTPUTS VARIOUS DATA ITEMS ON REQUEST
      C
5      IMPLICIT REAL*8(A-H,I-Z)
      COMMON /CONTRL/ TIME,
1      IPREV,
      COMMON /INUCAT/ RESID(3),
1      SF9IP(3), C2995(3,3), C2995(3,3), AREST(3)
2      C1992R(3,3), C2995I(3,3), AREST(3)
      COMMON /INPUTS/ AOUTANT,
1      STOP,
2      CVD2,
2      IIRHAV,
3      IFC(30),
4      RSMAX,
      COMMON /HVV/ C2992P(3,3), V92P(3),
1      C2992P(3,3), A17(3),
2      INTCOR(3), HXV(3),
3      SALE,
4      LAT,
5      XSCALE,
6      S2PHI,
7      C091C(3,3), C2993(3,3), C49,
9      ONX,
      COMMON /OUTPUT/ ITITLF(20),
1      OLAT,
2      V92I(3),
3      OLONG,
4      IPAGE,
      COMMON /PGRAW/ GLHSC,
1      GPH,
      COMMON /LEAJIN/ TIME,
1      H3,
2      TIME0,
3      CALF91
      COMMON /UNVRSL/ PI,
1      FF,
2      RESO
      DIMENSION IPARR(3,3)
      C
45      IF (IPRINT .LE. 57) GO TO 99
      WRITE(6,900) IPAGE
900  FORMAT ('1',I8,'IDEAL INS SIMULATOR',61X,'PAGE ',I3//,14X,
1      'TRAJECTORY',12X,'SIMULATOR',12X,'DIFFERENCE')
      IPAGE = IPAGE + 1
50      IPRINT = 5
      GO TO (1,2,3,4,5,6,6,9,10,11,12,13,14,15,16,17,18,19,20,
1      21,22,23,24,25,26,27,28,29,30),J
      WRITE(6,100) J
100  FORMAT (5X,'UNEXPECTED PRINT PARAM = ',I4,' NO ACTION')
      GO TO 419
1  WRITE(6,110) (WT(I),I=1,3)
110  FORMAT (5X,'HT:THU ',I1(2X,616,101)/)

```

1-29  
1-30





```

115      GO TO 809
      807 IPRINT = IPRINT + 1
      808 IPRINT = IPRINT + 1
      809 IPRINT = IPRINT + 1
      810 IPRINT = IPRINT + 2
120      23 CONTINUE
      21 CONTINUE
      22 CONTINUE
      23 CONTINUE
      24 CONTINUE
125      25 CONTINUE
      26 CONTINUE
      27 CONTINUE
      28 CONTINUE
      29 CONTINUE
130      30 CONTINUE
      RETURN
      END

```

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

53 I THERE IS NO PATH TO THIS STATEMENT.

SYMBOLIC REFERENCE MAP (P=1)

ENTRY POINTS  
DOUT

VARIABLES	SN	TYPE	RELOCATION	3	ALFOT	REAL	TRAJIN
31 A	REAL	ARRAY	NAV	0	ALFOT	REAL	TRAJIN
75 ALPHA	REAL	ARRAY	NAV	44	ALFOT	REAL	TRAJIN
100 APOSTO	REAL	ARRAY	IMUDAT	44	ALFOT	REAL	TRAJIN
77 CALF	REAL	ARRAY	NAV	24	CALF91	REAL	TRAJIN
22 CLAT91	REAL	ARRAY	IMUDAT	10	CV91	REAL	TRAJIN
11 CV92	REAL	ARRAY	IMUDAT	12	CV93	REAL	TRAJIN
165 C0900	REAL	ARRAY	NAV	0	C0902P	REAL	TRAJIN
154 C0910	REAL	ARRAY	NAV	177	C095	REAL	TRAJIN
45 C1090	REAL	ARRAY	IMUDAT	55	C1092P	REAL	TRAJIN
20 C2995	REAL	ARRAY	IMUDAT	57	C29951	REAL	TRAJIN
31 C9MIS	REAL	ARRAY	IMUDAT	22	C0910	REAL	TRAJIN
54 CALF	REAL	ARRAY	IMUDAT	153	CLF1	REAL	TRAJIN
100 DELT	REAL	ARRAY	NAV	123	DELTA	REAL	TRAJIN
14 DELTS	REAL	ARRAY	TRAJIN	47	DELTA	REAL	TRAJIN
43 OH	REAL	ARRAY	IMUDAT	52	OH	REAL	TRAJIN
57 OLONG	REAL	ARRAY	IMUDAT	55	OLONG	REAL	TRAJIN
44 OV	REAL	ARRAY	IMUDAT	210	OV592P	REAL	TRAJIN
3 OV9P	REAL	ARRAY	IMUDAT	14	OV92P	REAL	TRAJIN
4 F0	REAL	ARRAY	IMUDAT	6	F095C	REAL	TRAJIN
5 F0	REAL	ARRAY	IMUDAT	101	F0	REAL	TRAJIN
5 F0	REAL	ARRAY	IMUDAT	5	F097	REAL	TRAJIN



FILE NAMES MODE  
TAPF6 FMT

EXTERNALS TYPE ARGS  
47N 3

STATEMENT LABELS

62 1	65 2	70 3
73 4	76 5	101 6
122 9	125 9	130 10
133 11	135 12	141 13
144 14	165 15	206 16
227 17	232 18	240 19
253 20	253 21	257 22
253 23	253 24	253 25
253 26	253 27	253 28
253 29	253 30	16 30
403 100	FMT 316 110	FMT 327 120
348 130	FMT 351 140	FMT 352 150
175 160	FMT 411 190	FMT 422 190
433 200	FMT 444 210	FMT 455 220
470 230	FMT 503 240	FMT 521 250
537 260	FMT 553 270	FMT 566 280
577 290	FMT 0 307	FMT 245 308
247 309	251 310	FMT 264 303

LOOPS LABEL INDEX FROM-TO LENGTH PROPERTIES

104	* K	71 71	148	EXT REFS	NOT INNER
105	* I	71 71	118	EXT REFS	
147	* K	93 93	148	EXT REFS	NOT INNER
150	* I	93 93	118	EXT REFS	
170	* K	97 97	140	EXT REFS	NOT INNER
171	* I	97 97	118	EXT REFS	
211	* K	101 101	140	EXT REFS	NOT INNER
212	* I	101 101	118	EXT REFS	

COMMON BLOCKS LENGTH

CONTRL	9
INPUT	67
INPUTS	56
NAV	182
OUTPUT	48
PGPAP	7
TOAJIN	21
UNVRSU	10

STATISTICS

PROGRAM LENGTH	6178	399
CM LABELD COMMON LENGTH	6209	492

```
1 SUBROUTINE CMINTG
C
C THIS SUBROUTINE PERFORMS THE SUMMATION OF THE SIMULATED
C ACCELEROMETER DATA AFTER IT HAS BEEN TRANSFORMED TO THE
C PLATFORM FRAME
C
C IMPLICIT REAL(A-H,L-Z)
COMMON /CONTROL/ OIINC,
1 ITCV, INIT, PLTIME, PTIME,
COMMON /TIME/ RESID(3), NV3P(3), TCHCYL,
1 SF9P(3), C245(3,3), CMIS(4,3), FIAG(4), TCHCYP,
2 C1092P(3,3), C2P95T(3,3), ARESIG(3), TRSID(3), C1090(4,3),
COMMON /INOUTS/ ANUANT, VQUANT, STAPT,
1 STOPS, PLOTIM, PONT, TOLJPK, INCD2, SSYB,
2 CVD2, CVD3, ITRAIL, INCD3, SSX3,
3 ITC(3), IOPNLP, DMSMAX,
4 PSMAX, DMSMAX, ITRFIL
COMMON /NAV/ COR92P(3,3), V12P(3),
1 C2C9H(3,3), A13(3), B13(3),
2 ITCOR(3), XAV(3), C2P(3),
3 SALE, SALE, DELI,
4 LAT, LONG, XGALF,
5 XSALE, XGALF, X3P2P(3,3), W92P(3),
6 S2PHI, X2PHI, W92P(3), W92P(3),
7 C0912(3,3), C0P90(3,3), OH3,
8 O-X, O-Y, O-Z, C095(3,3), NV992P(3),
9 GAINS(3,3), ICLALGAINP(3), C2P95(4), OFILIP(3),
COMMON /UNVSL/ PI, WPI, HERT, RAPER,
1 EF, ESQ,
2 PESQ
COMMON /TRAJIN/ TIME, LATOT, LONG9T, ALFOT,
1 HQ, STAGT(3), V9T(3), SF9T(3), OFLTS,
2 TIMEQ, LONGQ, SLA9T, CLAT9I, SALF9I,
3 CALF9T
C
C TEMPORARY (?) PATCH FOR DISCONTINUITIES IN PROGRAMS ACCE
DO 55 I=1,3
IF (ABS(DELIS*(SEJIP(1)-SEJIP(1))) .LE. IOLJRK) GO TO 55
SF9T(1)=SF9T(1)
WRITE(6,5001) I, TIME
6001 FORMAT('CMINTG: DISCONTINUITY DETECTED ALONG AXIS',I2,
1 ' COMPONENT OF LINEAR ACCELERATION AT TIME = ",F12.5," SEC.")
2 ' DISCONTINUITY ASSUMED AT BEGINNING OF CYCLE')
C
55 CONTINUE
IF (MOD(I,CMCYL,2) .NE. 1) GO TO 63
C
C SYMPSONS RULE IF NUMBER OF INTERVALS IS EVEN
DO 170 I=1,3
IF (ICMCVP .EQ. 1) GO TO 167
IF (ICMCVP .EQ. 1) GO TO 166
IF (MOD(I,CMCYL,2) .EQ. 2) GO TO 165
W99P(1)=W99P(1)+2.*SF9T(1)
GO TO 170
160 W99P(1)=(W99P(1)+SF9T(1))/2.*ICMCYL/(1+ICMCYL-2)
170
```

34  
1-35  
Continue consecutive  
numbers

```

60 10 173
162 DV9P(1)=SF9P(1)+2.*SF9P(1)
60 10 170
165 DV9P(1)=DV9P(1)+4.*SF9P(1)
170 SF9P(1)=SF9P(1)
60 10 100
C
C TRAPEZOIDAL RULE IF NUMBER OF INTERVALS IS 000
C
63 00 60 I=1,3
DV9P(1)=DV9P(1)+(SF9P(1)+SF9P(1))/2.*DELTS
60 SF9P(1)=SF9P(1)
QUANTIZE THE VELOCITY OUTPUTS
C
C
C
100 ICMCYP=ICMCYP+1
IF (ICMCYP.LE. ICMCYL) RETURN
ICMCYP=1
DO 64 I=1,3
DV9P(1)=DV9P(1)+RESID(I)
64 RESID(I)=DV9P(1)
CALL UNTZ(DV9P(1),VQUAN/)
DO 66 I=1,3
66 RESID(I)=RESID(I)-DV9P(1)
70 RETURN
END

```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
1 CMINIG

VARIABLES	SN	TYPE	RELOCATION	3	ALF9T	REAL	TRAJTH
37 A	REAL	ARRAY	NAV	0	AQUANT	REAL	INPUTS
75 ALPHA	REAL	NAV	NAV	44	R	REAL	NAV
100 ARESID	REAL	ARRAY	IMUNAT	24	GALF9T	REAL	TRAJTH
77 CALF	REAL	NAV	NAV	10	CV01	REAL	IMPUTS
22 CLAT9T	REAL	TRAJTH	IMPUTS	12	CV02	REAL	IMPUTS
11 CVD2	REAL	NAV	NAV	3	CV03	REAL	NAV
165 CDP00	REAL	ARRAY	NAV	172	CG95	REAL	NAV
154 C0910	REAL	ARRAY	NAV	56	C1092P	REAL	IMUNAT
45 C1090	REAL	ARRAY	IMUNAT	67	CD995T	REAL	IMUNAT
20 C2P95	REAL	ARRAY	IMUNAT	22	C09H0	REAL	NAV
71 C9HTC	REAL	ARRAY	NAV	120	DELTA	REAL	NAV
153 DELH	REAL	NAV	NAV	16	DELTS	REAL	TRAJTH
123 OFITA	REAL	NAV	NAV	210	DV992P	REAL	NAV
65 PPSMAX	REAL	IMPUTS	IMPUTS	14	DV992P	REAL	NAV
7 DV9P	REAL	ARRAY	IMUNAT	6	FE99C	REAL	UNIVSL
4 CF	REAL	NAV	UNIVSL	191	ETA	REAL	NAV
6 F90	REAL	NAV	NAV	5	ETAT	REAL	TRAJTH
5 FIAGP	REAL	ARRAY	IMUNAT	226	GATHS	REAL	NAV
112 FILAIT	REAL	ARRAY	NAV				

VARIABLE	SN	TYPE	RELOCATION	NO	MOD	INTERP	INTRIN
11 G92P	24	REAL	APRAY	NAV			
12 HB	1	REAL	TRAJIN	NAV			
13 G92P	16	REAL	TRAJIN	NAV			
14 G92P	16	REAL	TRAJIN	NAV			
15 G92P	16	REAL	TRAJIN	NAV			
16 G92P	16	REAL	TRAJIN	NAV			
17 G92P	16	REAL	TRAJIN	NAV			
18 G92P	16	REAL	TRAJIN	NAV			
19 G92P	16	REAL	TRAJIN	NAV			
20 G92P	16	REAL	TRAJIN	NAV			
21 G92P	16	REAL	TRAJIN	NAV			
22 G92P	16	REAL	TRAJIN	NAV			
23 G92P	16	REAL	TRAJIN	NAV			
24 G92P	16	REAL	TRAJIN	NAV			
25 G92P	16	REAL	TRAJIN	NAV			
26 G92P	16	REAL	TRAJIN	NAV			
27 G92P	16	REAL	TRAJIN	NAV			
28 G92P	16	REAL	TRAJIN	NAV			
29 G92P	16	REAL	TRAJIN	NAV			
30 G92P	16	REAL	TRAJIN	NAV			
31 G92P	16	REAL	TRAJIN	NAV			
32 G92P	16	REAL	TRAJIN	NAV			
33 G92P	16	REAL	TRAJIN	NAV			
34 G92P	16	REAL	TRAJIN	NAV			
35 G92P	16	REAL	TRAJIN	NAV			
36 G92P	16	REAL	TRAJIN	NAV			
37 G92P	16	REAL	TRAJIN	NAV			
38 G92P	16	REAL	TRAJIN	NAV			
39 G92P	16	REAL	TRAJIN	NAV			
40 G92P	16	REAL	TRAJIN	NAV			
41 G92P	16	REAL	TRAJIN	NAV			
42 G92P	16	REAL	TRAJIN	NAV			
43 G92P	16	REAL	TRAJIN	NAV			
44 G92P	16	REAL	TRAJIN	NAV			
45 G92P	16	REAL	TRAJIN	NAV			
46 G92P	16	REAL	TRAJIN	NAV			
47 G92P	16	REAL	TRAJIN	NAV			
48 G92P	16	REAL	TRAJIN	NAV			
49 G92P	16	REAL	TRAJIN	NAV			
50 G92P	16	REAL	TRAJIN	NAV			
51 G92P	16	REAL	TRAJIN	NAV			
52 G92P	16	REAL	TRAJIN	NAV			
53 G92P	16	REAL	TRAJIN	NAV			
54 G92P	16	REAL	TRAJIN	NAV			
55 G92P	16	REAL	TRAJIN	NAV			
56 G92P	16	REAL	TRAJIN	NAV			
57 G92P	16	REAL	TRAJIN	NAV			
58 G92P	16	REAL	TRAJIN	NAV			
59 G92P	16	REAL	TRAJIN	NAV			
60 G92P	16	REAL	TRAJIN	NAV			
61 G92P	16	REAL	TRAJIN	NAV			
62 G92P	16	REAL	TRAJIN	NAV			
63 G92P	16	REAL	TRAJIN	NAV			
64 G92P	16	REAL	TRAJIN	NAV			
65 G92P	16	REAL	TRAJIN	NAV			
66 G92P	16	REAL	TRAJIN	NAV			
67 G92P	16	REAL	TRAJIN	NAV			
68 G92P	16	REAL	TRAJIN	NAV			
69 G92P	16	REAL	TRAJIN	NAV			
70 G92P	16	REAL	TRAJIN	NAV			
71 G92P	16	REAL	TRAJIN	NAV			
72 G92P	16	REAL	TRAJIN	NAV			
73 G92P	16	REAL	TRAJIN	NAV			
74 G92P	16	REAL	TRAJIN	NAV			
75 G92P	16	REAL	TRAJIN	NAV			
76 G92P	16	REAL	TRAJIN	NAV			
77 G92P	16	REAL	TRAJIN	NAV			
78 G92P	16	REAL	TRAJIN	NAV			
79 G92P	16	REAL	TRAJIN	NAV			
80 G92P	16	REAL	TRAJIN	NAV			
81 G92P	16	REAL	TRAJIN	NAV			
82 G92P	16	REAL	TRAJIN	NAV			
83 G92P	16	REAL	TRAJIN	NAV			
84 G92P	16	REAL	TRAJIN	NAV			
85 G92P	16	REAL	TRAJIN	NAV			
86 G92P	16	REAL	TRAJIN	NAV			
87 G92P	16	REAL	TRAJIN	NAV			
88 G92P	16	REAL	TRAJIN	NAV			
89 G92P	16	REAL	TRAJIN	NAV			
90 G92P	16	REAL	TRAJIN	NAV			
91 G92P	16	REAL	TRAJIN	NAV			
92 G92P	16	REAL	TRAJIN	NAV			
93 G92P	16	REAL	TRAJIN	NAV			
94 G92P	16	REAL	TRAJIN	NAV			
95 G92P	16	REAL	TRAJIN	NAV			
96 G92P	16	REAL	TRAJIN	NAV			
97 G92P	16	REAL	TRAJIN	NAV			
98 G92P	16	REAL	TRAJIN	NAV			
99 G92P	16	REAL	TRAJIN	NAV			
100 G92P	16	REAL	TRAJIN	NAV			

FILE NAMES MORE

TAPE6

EXTERNALS QNTIZ TYPE ARGS 2

INLINE FUNCTIONS TYPE ARGS 1 INTRIN

STATEMENT LABELS

14 50	8 60
15 50	9 60
16 100	47 100
17 100	60 100

57 63	INACTIVE
6 70	
26 100	
100 100	

05/25/76 17.12.47

EIN 4.5+8906

SUBROUTINE CHINIG 74/74 OPT=0 TRACE

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT REFS
3	55	I	39 46	148		
22	176	I	51 62	148	opt	
69	60	I	67 69	118	opt	
77	54	I	77 79	58	INSTACK	
110	66	I	81 82	40	INSTACK	

COMMON BLOCKS	LENGTH
CONTROL	9
INPUT	67
INPUTS	56
NAV	142
UNVPSL	10
TRAJIN	21

STATISTICS

PROGRAM LENGTH	1538	107
CM LABELED COMMON LENGTH	5310	345





SYMBOLIC REFERENCE MAP (R-1)

ENTRY POINTS  
3 JORCOP

VARIABLES	SN	TYPE	RELOCATION	75	ALPHA	REAL	ARRAY	NAV	F.P.
0 AQUANT	75	REAL	NAV	0	AV92P	REAL	ARRAY	NAV	F.P.
1 ANP92P	44	REAL	F.P.	44	R	REAL	ARRAY	NAV	F.P.
77 CALF	10	REAL	NAV	10	CV31	REAL	ARRAY	NAV	F.P.
11 CVP2	12	REAL	INPUTS	12	CV31	REAL	ARRAY	NAV	F.P.
155 CUP9J	0	REAL	NAV	0	CV92P	REAL	ARRAY	NAV	F.P.
354 CQ910	177	REAL	NAV	177	CV95	REAL	ARRAY	NAV	F.P.
22 CQ2HO	153	REAL	NAV	153	DELH	REAL	ARRAY	NAV	F.P.
190 DLT	123	REAL	NAV	123	DFLTA	REAL	ARRAY	NAV	F.P.
58 JCSHAX	213	REAL	INPUTS	213	DV582P	REAL	ARRAY	NAV	F.P.
14 DV92P	4	REAL	NAV	4	FF	REAL	ARRAY	NAV	F.P.
6 EFFR2J	5	REAL	UNVSL	5	ECO	REAL	ARRAY	NAV	F.P.
191 STA	112	REAL	NAV	112	FTLATT	REAL	ARRAY	NAV	F.P.
225 GAINS	71	REAL	NAV	71	G22P	REAL	ARRAY	NAV	F.P.
74 H	1	REAL	NAV	1	H01	REAL	ARRAY	NAV	F.P.
15 HSOING	14	REAL	INPUTS	14	HSOIM	REAL	ARRAY	NAV	F.P.
117 HV92P	126	REAL	NAV	126	I	REAL	ARRAY	NAV	F.P.
22 ICRLIM	253	REAL	INPUTS	253	ICAINP	REAL	ARRAY	NAV	F.P.
21 IMUTYP	23	REAL	INPUTS	23	IMCOP	REAL	ARRAY	NAV	F.P.
51 IOPHLP	23	REAL	INPUTS	23	IOP	REAL	ARRAY	NAV	F.P.
17 IPEATT	67	REAL	INPUTS	67	IPEFL	REAL	ARRAY	NAV	F.P.
15 ITRHAV	105	REAL	INPUTS	105	LAT	REAL	ARRAY	NAV	F.P.
105 LONG	213	REAL	NAV	213	OV	REAL	ARRAY	NAV	F.P.
214 OY	215	REAL	NAV	215	OZ	REAL	ARRAY	NAV	F.P.
222 OFILTR	176	REAL	NAV	176	Q43	REAL	ARRAY	NAV	F.P.
142 OV92P	3	REAL	NAV	3	PI	REAL	ARRAY	NAV	F.P.
5 PLOTIM	6	REAL	INPUTS	6	PENT	REAL	ARRAY	NAV	F.P.
216 22P35	10	REAL	NAV	10	PAPER	REAL	ARRAY	NAV	F.P.
11 RESQ	17	REAL	UNVSL	17	PHO	REAL	ARRAY	NAV	F.P.
3 R92	55	REAL	UNVSL	55	CSMAX	REAL	ARRAY	NAV	F.P.
7 RSTPT	2	REAL	INPUTS	2	P3	REAL	ARRAY	NAV	F.P.
76 SALT	52	REAL	NAV	52	SSV0	REAL	ARRAY	NAV	F.P.
53 SSV0	64	REAL	THOUTS	64	SSV0	REAL	ARRAY	NAV	F.P.
3 SIAP1	4	REAL	INPUTS	4	STOP	REAL	ARRAY	NAV	F.P.
145 S2PHI	53	REAL	NAV	53	THICOR	REAL	ARRAY	NAV	F.P.
55 THETP	53	REAL	NAV	53	THITRO	REAL	ARRAY	NAV	F.P.
17 TOLJ2K	1	REAL	THOUTS	1	TQUANT	REAL	ARRAY	NAV	F.P.
104 V92P	2	REAL	NAV	2	VQUANT	REAL	ARRAY	NAV	F.P.
137 V92	11	REAL	NAV	11	V92P	REAL	ARRAY	NAV	F.P.
2 WERT	56	REAL	UNVSL	56	WXY	REAL	ARRAY	NAV	F.P.
125 XCALF	152	REAL	NAV	152	XH	REAL	ARRAY	NAV	F.P.
124 XCALF	146	REAL	NAV	146	X2PHI	REAL	ARRAY	NAV	F.P.
147 VV92P	125	REAL	NAV	125	X9992P	REAL	ARRAY	NAV	F.P.

EXTERNALS TYPE A2GS  
DOUT 1  
VP 1

STATEMENT LABELS

05/25/76 17.12.47

ETN.4.520406

SUBROUTINE IORCOP 74/74 OPI=0 TRACE

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
16	5A0	* I	26 28	240	EYI REFS
51	710	* I	30 40	110	EYI REFS

COMMON BLOCKS LENGTH

INPUTS	56
NAV	182
UNVRSI	10

STATISTICS

PROGRAM LENGTH	1330	91
CM LABELED COMMON LENGTH	3700	240

```

1      SUBROUTINE INPNAV
C
C      THIS SUBROUTINE REPRESENTS THOSE CALCULATIONS THAT WOULD BE
C      PERFORMED BY AN AIRBORNE AVIONICS COMPUTER
C
5      IMPLICIT REAL(A-H,I,REAL(16))
COMMON /CONTRL/ OTIME,
-1 TREV, INIT,
-1 COMMON /IMUGAT/ RV92P(1),
-1 SE92P(1), G2P95(1,3), G2P95(1,3), G1090(1,3),
10      2 G1092P(1,3), G2P95T(1,3), G2P95T(1,3),
-1 STOP, PL01M,
1 COMMON /INPSTS/ AQUANT,
-1 STOP, CVO2,
2 ITCNAV, ITCAT,
15      3 ITC(1,1), IOPHLP,
-1 RSPAX, RSCMAX, ITRFIL
4 COMMON /NAV/ COP92P(1,3), V92P(1,3),
-1 CORHO(1,3), A(1,3),
20      2 THICOR(1), MXV(1),
-1 SALF, CALF,
4 LAT, LONG,
5 XSALF, XCALF,
25      6 S2PHI, XS2PHI,
-1 COP92P(1,3), OH9,
7 ODX, ODY,
9 GAINS(1,10), IGAINP(1,3)
COMMON /RGRV/ GLHSC,
1 G2H, G4H2,
COMMON /TRAJIM/ TIME,
30      1 H9, ETAGT(1),
-1 TIMD, LONGO,
2 TIMD, LONGO,
3 CALF9T
COMMON /UNVRSL/ PI,
35      1 EF, FSQ,
-1 RESQ
C
C      TRANSFORM VELOCITY INCREMENTS TO LLWA: ZERO THE VELOCITY
C      SUM FROM THE PLATFORM
C
40      100 DO I=1,3
-1 RV92P(I) = V92P(I)
110 RV92P(I) = 0.0
IF (IPC(1).EQ. 0) GO TO 300
CALL ROUT(1)
C
45      VLCIV -- VELOCITY UPDATE SUBROUTINE
C
300 CONTINUE
305 DO I=1,3
-1 V92P(I) = V92P(I)
V92P(I) = V92P(I) + V92P(I) + V92P(I) + V92P(I) + V92P(I) + V92P(I)
310 CONTINUE
55      V92P(I) = V92P(I) + V92P(I) + V92P(I) + V92P(I) + V92P(I) + V92P(I)

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	C	ALSO EXTRAPOLATE NEW V92P TO ORBITALM XV92P	
60	C	IF (IPC(29) .EQ. 3) GO TO 320	010310
		DO 315 I=1,3	010320
		XV92P(I)=VP(VP(1),5*V92P(I))-VP(0,5*OV92P(I))	010730
		315 XV92P(I)=VP(12,5*VB(OV92P(I)+V92P(I)))	010340
		320 CONTINUE	010350
65		IF (IPC(4) .EQ. 2) GO TO 400	010360
		CALL DOUT(4)	010740
	C		010400
	C	APATE -- ANGULAR RATES SURROUTINE	010410
	C		010420
70		400 CONTINUE	010430
	C		010440
410	IF (IPC(3)) .NE. 0) GO TO 420		010450
	GM32S = VP(COP92P(3,2)*2)		010460
	GM32S = VP(COP92P(3,3)*2)		010470
75	GMR3 = VP(VF(VP(2,0*EF920)*COP92P(3,2))*COP92P(3,3))		010480
	OHEM = VP(1,0 - VP(4*RR0))		010490
	OHEM(2) = VP(VP(VP(1)-V92P(3)) *RR0)*VP((ONEH-VP(EF*VP(VP(1.-VP(3.*OC C10510		
	A43Q(2))-OCH32S(3))) - VP(V92P(2)*GRRP))		010520
	ZHQ(3)=VP(VP(VP(V92P(2)*Z920)*VP(ONEH-VP(EF*VP(VP(1.-VP(3.*		010530
80	A OCW32S)-(OCW32S(3))) VP(V92P(3)*CO92P )		010540
	GO TO 430		010550
	420 CONTINUE		010560
	IF (IPC(29) .EQ. 2) GO TO 422		010570
	CALL ANGVL2(HV92P,XSALF,XCALF,XS2PHI,XH)		010580
	GO TO 430		010590
85	422 CONTINUE		010600
	CALL ANCVL2(V92P,SALF,CALF,S2PHI,H)		010610
	CONTINUE		010620
90	IF (IPC(5) .EQ. 0) GO TO 490		010630
	CALL DOUT(5)		010640
	490 CONTINUE		010650
	C	OCM UPDATE IS FIRST OR SECOND ORDER	010660
	C		010670
95	CALL DCURBD(GCPHO,0,E0,VP(PHO(2)*DEL T),VP(PHO(3)*DEL T),IPC(28),		010680
	1 0,E0,A(1,1),A(1,2),A(1,3))		010690
	CALL VMMA(COP92P,GPHD)		010700
	DO 520 I=1,3		010710
	DO 520 J=1,3		010720
	G999P(I,J) = VP(COP92P(I,J) + A(I,J))		010730
	IF (IPC(29) .EQ. 0) GO TO 520		010740
	XVP92P(I,J)=VP(COP92P(I,J)+VP(0,5*A(I,J)))		010750
	520 CONTINUE		010760
	C		010770
	C	ORTHONORMALIZE IF OTIME .GT. TIME	010780
	C		010790
	IF (IPC(6) .EQ. 0) GO TO 522		010800
	CALL DOUT(6)		010810
	522 CONTINUE		010820
	IF (TIME .LT. OTIME) GO TO 550		010830
	OTIME = VP(ETIME + VP(INCOS*DEL T))		010840
	CALL ORTHOM(COP92P)		010850
	IF (TIME .GT. OTIME)		010860
110			010870



VARIABLES	SN	TYPE	RELOCATION	123	DELTA	REAL	NAV
179 DELT	179	REAL	NAV	123	DELTA	REAL	NAV
16 DELTS	16	REAL	TRAJIN	66	DELTA	REAL	TRAJIN
210 DV52P	210	REAL	ARRAY	3	DELTA	REAL	ARRAY
14 DV92P	14	REAL	ARRAY	4	DELTA	REAL	ARRAY
6 EFP9P	6	REAL	UNVRS	5	DELTA	REAL	UNVRS
101 EIA	101	REAL	ARRAY	5	DELTA	REAL	ARRAY
5 EIA9T	5	REAL	ARRAY	112	DELTA	REAL	ARRAY
227 GAINF	227	REAL	ARRAY	0	DELTA	REAL	ARRAY
4 GPCNF	4	REAL	ARRAY	0	DELTA	REAL	ARRAY
5 GPHS2	5	REAL	ARRAY	5	DELTA	REAL	ARRAY
2 GPC2	2	REAL	ARRAY	3	DELTA	REAL	ARRAY
71 G42P	71	REAL	ARRAY	74	DELTA	REAL	ARRAY
4 H9	4	REAL	ARRAY	1	DELTA	REAL	ARRAY
15 H92NC	15	REAL	ARRAY	14	DELTA	REAL	ARRAY
137 H92P	137	REAL	ARRAY	653	DELTA	REAL	ARRAY
7 H9CPL	7	REAL	ARRAY	263	DELTA	REAL	ARRAY
27 IIRLH	27	REAL	ARRAY	29	DELTA	REAL	ARRAY
21 IMUTP	21	REAL	ARRAY	61	DELTA	REAL	ARRAY
5 INIT	5	REAL	ARRAY	6	DELTA	REAL	ARRAY
23 IPC	23	REAL	ARRAY	67	DELTA	REAL	ARRAY
17 ITRAT	17	REAL	ARRAY	570	DELTA	REAL	ARRAY
15 ITPNAV	15	REAL	ARRAY	1	DELTA	REAL	ARRAY
105 LAT	105	REAL	ARRAY	20	DELTA	REAL	ARRAY
106 LONG	106	REAL	ARRAY	213	DELTA	REAL	ARRAY
2 LONG9T	2	REAL	ARRAY	215	DELTA	REAL	ARRAY
14 ONV	14	REAL	ARRAY	176	DELTA	REAL	ARRAY
222 OFILTP	222	REAL	ARRAY	0	DELTA	REAL	ARRAY
667 OHF4	667	REAL	ARRAY	0	DELTA	REAL	ARRAY
142 OV92P	142	REAL	ARRAY	0	DELTA	REAL	ARRAY
5 PLATH	5	REAL	ARRAY	2	DELTA	REAL	ARRAY
6 PPH	6	REAL	ARRAY	1	DELTA	REAL	ARRAY
216 QP95	216	REAL	ARRAY	13	DELTA	REAL	ARRAY
0 QFSID	0	REAL	ARRAY	11	DELTA	REAL	ARRAY
17 RMO	17	REAL	ARRAY	3	DELTA	REAL	ARRAY
65 RSMAX	65	REAL	ARRAY	3	DELTA	REAL	ARRAY
7 RSTRT	7	REAL	ARRAY	2	DELTA	REAL	ARRAY
76 SELF	76	REAL	ARRAY	23	DELTA	REAL	ARRAY
13 SF9T	13	REAL	ARRAY	15	DELTA	REAL	ARRAY
21 SLAT9T	21	REAL	ARRAY	62	DELTA	REAL	ARRAY
63 SYVO	63	REAL	ARRAY	54	DELTA	REAL	ARRAY
3 STAPT	3	REAL	ARRAY	4	DELTA	REAL	ARRAY
145 S2PH1	145	REAL	ARRAY	63	DELTA	REAL	ARRAY
55 THICPT	55	REAL	ARRAY	59	DELTA	REAL	ARRAY
0 TIMF	0	REAL	ARRAY	17	DELTA	REAL	ARRAY
13 TOLJOK	13	REAL	ARRAY	4	DELTA	REAL	ARRAY
1 TOUNT	1	REAL	ARRAY	42	DELTA	REAL	ARRAY
124 VOMP	124	REAL	ARRAY	2	DELTA	REAL	ARRAY
10 V9T	10	REAL	ARRAY	107	DELTA	REAL	ARRAY
11 V92P	11	REAL	ARRAY	7	DELTA	REAL	ARRAY
12 W	12	REAL	ARRAY	66	DELTA	REAL	ARRAY
125 XCALF	125	REAL	ARRAY	152	DELTA	REAL	ARRAY
631 XH3	631	REAL	ARRAY	124	DELTA	REAL	ARRAY
146 X22PH1	146	REAL	ARRAY	147	DELTA	REAL	ARRAY
126 XPP92P	126	REAL	ARRAY	147	DELTA	REAL	ARRAY

05/25/76 17.12.67

EIN 4.5+P406.

SUBROUTINE INRNV 7474 OP18 TRACE

EXTENSION	TYPE	ARGS	OR-MUPD	OR-MUPD	OR-MUPD
ANGVLZ	1	5	3	3	3
DOUX	1	1	3	3	3
ORTHO	1	1	3	3	3
TOPSOP	2	2	3	3	3
VP	1	1	3	3	3

STATEMENT LABELS	INACTIVE	INACTIVE	INACTIVE	INACTIVE	INACTIVE	INACTIVE
0 100	0	110	0	110	0	110
0 305	0	310	0	310	0	310
112 320	115	490	115	490	115	490
243 420	247	422	247	422	247	422
254 490	323	520	323	520	323	520
351 550	0	600	0	600	0	600
0 910	377	815	377	815	377	815
454 900	500	1600	500	1600	500	1600

LOOPS	LA9FL	INDEX	FROM-TO	LENGTH	PROPERTIES
3	110	1	41 43	100	EXT. DEFS
16	310	1	50 54	260	EXT. REFS
61	315	1	61 63	278	EXT. DEFS
273	520	1	98 103	358	EXT. DEFS NOT INNER
274	520	1	99 103	320	EXT. DEFS

COMMON BLOCKS	LENGTH
CONTROL	9
INPUTS	56
NAV	182
PPAV	7
TPAJIN	21
UNVRSI	10

STATISTICS	PROGRAM LENGTH	CM LABELED COMMON LENGTH
	6720	442
	5400	352







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1      SUBROUTINE GRAV(AOP92P,AS2PHI,AM)
      C
      C THIS SUBROUTINE COMPUTES THE COMPONENTS OF GRAVITY IN THE ILMW
      C FRAME. THESE RESULTS ARE RETURNED IN G92P(1) THRU (3). ALSO
      C COMPUTED IS SINF(PHI)*2. THIS IS RETURNED THRU THE
      C ARGUMENT LIST. THESE CALCULATIONS DUPLICATE THOSE OF THE
      C FLIGHT PROFILE GENERATOR
      C
      IMPLICIT REAL(A-H,L-Z)
      COMMON /NAV2/ COP92P(1,3),V92P(3),
      1      C9RHO(3,3), A(3,3),
      2      THICD(3), WV(3),
      3      SALF, CALF,
      4      LAT, LONG,
      5      XSALF, XCALF,
      6      S2PHI, XS2PHI,
      7      C0910(3,3), C0901(3,3), OH3,
      8      C09, C09,
      9      GAIN(3,10), IGAINP(3)
      COMMON /PG2AV/ GLHSC,
      1      GRH, GRH2,
      2      DIMENSION AOP92P(1,3),
      3      AS2PHI= VP(AOP92P(3,1)*2)
      COEF = VP(VF(-GLHSC*AM)*AOP92P(3,1))
      G92P(1) = VP(-VP(VP(IGPCNT +VP(GPS2*AS2PHI(1)) +VP(GPS4*VP(AS2PHI*2011910
      1) ) * VP(1) - VP(VP(VP(G04 -
      1      VP(GRHS*AS2PHI(1)*AM) -VP(GRHS*VP(AH*2))))))
      G92P(2) = VP(-COEF*A092P(3,2))
      G92P(3) = VP(COEF*A092P(3,3))
      RETURN
      END

```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
1 GRAV

VARIABLES	SN	TYPE	RELOCATION	0	AH	REAL	F.O.
75 ALPHA	REAL	ARRAY	NAV	0	AS2PHI	REAL	F.O.
76 AOP92P	REAL	ARRAY	NAV	44	B	REAL	NAV
77 CALF	REAL	ARRAY	NAV	163	COEF	REAL	NAV
165 C0P90	REAL	ARRAY	NAV	0	COP92P	REAL	NAV
164 C0910	REAL	ARRAY	NAV	177	C095	REAL	NAV
22 C0910	REAL	ARRAY	NAV	163	DELTA	REAL	NAV
193 DELTA	REAL	ARRAY	NAV	173	DELTA	REAL	NAV
217 DV92P	REAL	ARRAY	NAV	14	DV92P	REAL	NAV
101 FIA	REAL	ARRAY	NAV	112	FILAIT	REAL	NAV
226 GAIN	REAL	ARRAY	NAV	0	GLHSC	REAL	NAV
1 GPCNT	REAL	PG2AV	PG2AV	4	G04	REAL	PG2AV
6 GRH	REAL	PG2AV	PG2AV	5	G04P	REAL	PG2AV
7 GRH2	REAL	PG2AV	PG2AV	1	G04P	REAL	PG2AV

SUBROUTINE GPAY

VARIABLES	SM	TYPE	RELLOCATION	23	IGAINP	INTEGER	100AY	NAV
137 HVSPP	REAL	ARRAY	NAV	185	LONG	REAL	100AY	NAV
185 LAI	REAL	NAV	NAV	216	NAV	REAL	100AY	NAV
213 ONY	REAL	NAV	NAV	222	CFIL12	REAL	100AY	NAV
215 02Z	REAL	NAV	NAV	142	CV120	REAL	100AY	NAV
176 OHR	REAL	NAV	NAV	17	CH3	REAL	100AY	NAV
216 02P05	REAL	NAV	NAV	145	CH3	REAL	100AY	NAV
76 SALT	REAL	NAV	NAV	55	INTCPT	REAL	100AY	NAV
62 INTCOP	REAL	NAV	NAV	154	VW4P	REAL	100AY	NAV
68 INTCPO	REAL	NAV	NAV	11	VW2P	REAL	100AY	NAV
107 V92	REAL	NAV	NAV	125	XC1LF	REAL	100AY	NAV
66 XH	REAL	NAV	NAV	124	YS1LF	REAL	100AY	NAV
152 XH	REAL	NAV	NAV	147	XV2P	REAL	100AY	NAV
145 X52PHI	REAL	NAV	NAV					
125 X5032P	REAL	NAV	NAV					

EXTERNALS	TYPE	ARGS
VP	REAL	1

COMMON BLOCKS	LENGTH
NAV	182
PGPAY	7

STATISTICS	PROGRAM LENGTH	1648	116
CM LABELED COMMON LENGTH		2759	149



VARIABLES SN TYPE RELOCATION

71	G92P	REAL	APRAY	NAV	74	H	REAL	NAV
1	HPI	REAL	UNVSL	NAV	137	HV92P	REAL	NAV
263	ICATNP	INTEGER	APRAY	NAV	105	LAT	REAL	NAV
125	LONG	REAL	NAV	NAV	213	ODX	REAL	NAV
214	OUY	REAL	NAV	NAV	215	ODZ	REAL	NAV
222	OFILTP	REAL	APRAY	NAV	175	OH3	REAL	NAV
142	OV92P	REAL	APRAY	NAV	3	PI	REAL	UNVSL
216	QPP95	REAL	APRAY	NAV	10	PANDER	REAL	UNVSL
11	RFSO	REAL	UNVSL	NAV	17	PH3	REAL	NAV
161	22	REAL	UNVSL	NAV	153	EP	REAL	NAV
7	QPP	REAL	UNVSL	NAV	2	PS	REAL	UNVSL
74	SALF	REAL	NAV	NAV	145	SPPHI	REAL	NAV
63	THTPOD	REAL	APRAY	NAV	55	THTPT	REAL	NAV
62	THTPO	REAL	APRAY	NAV	156	THT1	REAL	NAV
147	TMP2	REAL	NAV	NAV	104	VDP	REAL	NAV
154	VE	REAL	NAV	NAV	3	VLCIV	REAL	F.P.
155	VH	REAL	NAV	NAV	107	V12	REAL	NAV
11	V92P	REAL	APRAY	NAV	162	W5	REAL	NAV
7	WPT	REAL	NAV	NAV	153	W4	REAL	NAV
66	XV	REAL	APRAY	NAV	125	XCALF	REAL	NAV
152	XH	REAL	NAV	NAV	124	XCALF	REAL	NAV
145	XS2PHI	REAL	NAV	NAV	147	XV92P	REAL	NAV
125	Y92P	REAL	APRAY	NAV				

EXTERNALS VP TYPE ARGS

REAL	1	VSORT	REAL	1
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COMMON BLOCKS LENGTH

NAV	152
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UNVSL	10
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STATISTICS

PROGRAM LENGTH	1640	116
COMMON LENGTH	3068	192



SUBROUTINE ATUDE 74/74 OPT=0 TRACE

ETH 4.5+0.96

VARIABLES	SN	TYPE	RELOCATION	6	ETAOP	REAL	APPAY	INPUTS
101 ETA	REAL	APPAY	NAV	225	GAINS	REAL	APPAY	INPUTS
112 FILATT	REAL	APPAY	NAV	74	H	REAL	APPAY	INPUTS
15 HS0INC	REAL	APPAY	NAV	14	HS0IIM	REAL	APPAY	INPUTS
137 HC92P	REAL	APPAY	NAV	22	IC9LI4	INTEGER	APPAY	INPUTS
263 IGAINP	INTEGER	APPAY	NAV	21	IMUVO	INTEGER	APPAY	INPUTS
23 INCON	INTEGER	APPAY	NAV	61	IO9ML3	INTEGER	APPAY	INPUTS
23 IPC	INTEGER	APPAY	NAV	17	IT9AT	INTEGER	APPAY	INPUTS
67 IIPFIL	INTEGER	APPAY	NAV	16	IT9NAV	INTEGER	APPAY	INPUTS
105 LAI	REAL	APPAY	NAV	105	LONG	REAL	APPAY	INPUTS
214 ONX	REAL	APPAY	NAV	214	ONY	REAL	APPAY	INPUTS
215 ODZ	REAL	APPAY	NAV	222	OFILTR	REAL	APPAY	INPUTS
176 OHM	REAL	APPAY	NAV	142	OV12P	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	5	POUT	REAL	APPAY	INPUTS
17 RHO	REAL	APPAY	NAV	3	POCID	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	55	PSHAY	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	76	SALF	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	62	SSXG	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	64	SSZD	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	4	STDP	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	63	THICOR	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	60	THICQ	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	1	TQUANT	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	104	VQMP	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	107	VQ2	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	12	WT	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	20	X	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	152	XH	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	145	XS2PHI	REAL	APPAY	INPUTS
210 2P95	REAL	APPAY	NAV	125	XG992D	REAL	APPAY	INPUTS

EXTENSIONALS    TYPE    ARGS  
 VATAH2    REAL    2  
 VSORT    REAL    1

COMMON BLOCKS    LENGTH  
 INPUTS    56  
 INPUTS    67  
 NAV    182

STATISTICS  
 PROGRAM LENGTH    518    49  
 CM LABELED COMMON LENGTH    4618    305



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1      SUBROUTINE INITI
2      C
3      C THIS ROUTINE PERFORMS MUCH OF THE INITIALIZATION OF THE
4      C NAV SIMULATOR. THE DESI IS PERFORMED BY THE EXEC AND INREC.
5      C
6      C
7      C
8      C
9      C
10     C IMPLICIT REAL(A-H),REAL(L-Z)
11     C COMMON /CONTRL/ QTIME, PTIME, PLYME, RSTIME,
12     C 1 TYPEV, THIT, ICNVL, ICNVC,
13     C 2 SEIP(3), G2P95(3,3), G2P95(3,3), G2P95(3,3),
14     C 3 C1092P(3,3), G2P95(3,3), G2P95(3,3),
15     C 4 STOP, PLOTH, AQUANT, VQUANT, STAGT,
16     C 5 CVD2, CVD3, TOLJX, HSTIM, HSTING,
17     C 6 ITPHAY, TIRAT, INCO, THUTP, TIOLM,
18     C 7 ITC(10), IONLR, SSKJ, SSYG,
19     C 8 RSMAX, QSMAX, TIRFIL,
20     C 9 COMMON /NAV/ COP92P(3,3), V2P(3),
21     C 10 CARM(3,3), A(3,3), T(3,3),
22     C 11 THICOP(3), WCV(3), G2P(3),
23     C 12 SALF, CALF,
24     C 13 LAT, LONG, V2(3),
25     C 14 XSALF, XCALF, X92P(3,3), W92P(3,3),
26     C 15 XS2PHI, XS2PHI, X92P(3),
27     C 16 COP92(3,3), COP90(3,3), O43,
28     C 17 ODX, ODX, ODX,
29     C 18 GAIN(2,10), ICAINP(3),
30     C 19 COMMON /ZEGZAV/ GLHSC,
31     C 20 GRH, GRH2,
32     C 21 HR, STAGT(3), LAT9T,
33     C 22 TIMEG, LONGG, SLAT9T,
34     C 23 CALFAT,
35     C 24 COMMON /UNVSL/ PL, HPI,
36     C 25 EF, FSQ, EFRQ,
37     C 26 LONGG = VP(LONG9T)
38     C 27 TIMEG = TIME
39     C 28 LAT = VP(LAT9T)
40     C 29 LONG = LONGG
41     C 30 ALPHA = VP(-ALF9T)
42     C 31 SALE = VSIN(1/ALPHA)
43     C 32 CALF = VCOS(1/ALPHA)
44     C 33 V2P(1) = VP(V2(1))
45     C 34 V2P(2) = VP(V2(2))
46     C 35 V2P(3) = VP(V2(3))
47     C 36
48     C 37
49     C 38
50     C 39
51     C 40
52     C 41
53     C 42
54     C 43
55     C 44
56     C 45
57     C 46
58     C 47
59     C 48
60     C 49
61     C 50
62     C 51
63     C 52
64     C 53
65     C 54
66     C 55
67     C 56
68     C 57
69     C 58
70     C 59
71     C 60
72     C 61
73     C 62
74     C 63
75     C 64
76     C 65
77     C 66
78     C 67
79     C 68
80     C 69
81     C 70
82     C 71
83     C 72
84     C 73
85     C 74
86     C 75
87     C 76
88     C 77
89     C 78
90     C 79
91     C 80
92     C 81
93     C 82
94     C 83
95     C 84
96     C 85
97     C 86
98     C 87
99     C 88
100    C 89
101    C 90
102    C 91
103    C 92
104    C 93
105    C 94
106    C 95
107    C 96
108    C 97
109    C 98
110    C 99
111    C 100
112    C 101
113    C 102
114    C 103
115    C 104
116    C 105
117    C 106
118    C 107
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01 7220 IF (IPC(79) .NE. 0) GO TO 410
01 7230 DCM32S = VP(COP92P(3,2))*2)
01 7240 YCM32S = VP(COP92P(3,3))*2)
01 7250 CORR = VP(VF(VB(2,0)*EFB20)*COP92P(3,2))*COP92P(3,3))
01 7260 QNEM = VP(1,0 - VP(H*PQ1))
01 7270 RHQ(12) = VP(VP(VP(1-V92P(3)*RR0)*VP((ONE4-VP(EF*VP(VP(1,1-VP(3,*
01 7280 AHS(11)-DCM32S(11)))-VP(V92P(2)*C92P(1))
01 7290 RHQ(33)=VP(VP(VP(V92P(2)*7280)*VP(OJF4-VP(EF*VP(VP(1,1-VP(3,*
01 7300 A DCM32S(11)-ECM32S(11)) *VP(V92P(3)*C92P(1))
01 7310 GO TO 452
01 7320 410 IF (IPC(29) .EQ. 0) CALL ANGVL2(V92P,SALF,CALF,S2PHI,H)
01 7330 450 IF (IPC(29) .EQ. 0) GO TO 500
01 7340 YS2PHI=S2PHI
01 7350 XH=H
01 7360 HV92P(1)=V92P(1)
01 7370 HV92P(12)=V92P(12)
01 7380 HV92P(13)=V92P(13)
01 7390 XCALF=CALF
01 7400 XSALF=SALF
01 7410 X92P(11)=V92P(11)
01 7420 X92P(12)=V92P(12)
01 7430 X92P(13)=V92P(13)
01 7440 YF (IPC(70) .NE. 0) CALL ANGVL2(HV92P,XSALF,XCALF,XS2PHI,YH)
01 7450 IF (IPC(15) .NE. 0) CALL DOUT(51)
01 7460 C
01 7470 C DCH UPDATE IS FIRST OR SECOND ORDER
01 7480 C
01 7490 C
01 7500 CALL DCHUPD(C92PHQ,VP(REF11)*DELTL,VP(RHQ(21)*DELTL),VP(RHQ(33)*DELTL),C)
01 7510 ATPC(24),
01 7520 1 E.EO,A(1,1),A(1,2),A(1,3))
01 7530 CALL VMW(A,COP92P,C92PHQ)
01 7540 GO 520 I=1,3
01 7550 GO 520 J=1,3
01 7560 X92P(11,1)=VP(C92P2P(1,1)+VP(10,5)*A(1,1))
01 7570 520 CONTINUE
01 7580 IF (TIME .LT. OTIME) GO TO 550
01 7590 OTIME = VP(OTIME + VP(INCOR*DELTI))
01 7600 CALL OTHO(COP92P)
01 7610 IF (IPC(7) .EQ. 0) GO TO 550
01 7620 CALL DOUT(7)
01 7630 550 CONTINUE
01 7640 CALL GPAY(XOP92P,YS2PHI,XH)
01 7650 IF (IPC(12) .NE. 0) CALL DOUT(12)
01 7660 CALL POSVEL
01 7670 CALL ANGVL2(XV92P,XSALF,XCALF,XS2PHI,YH)
01 7680 CALL FORCOR(X92P2P,XV92P)
01 7690 INIT=1
01 7700 DELT=H
01 7710 600 IF (IPC(15) .NE. 0) CALL DOUT(5)
01 7720 CALL FORCOR(COP92P,V92P)
01 7730 C92PHQ(2,1) = VP(RHQ(33)*DELTL)
01 7740 C92PHQ(3,1) = VP(RHQ(33)*DELTL)
01 7750 C92PHQ(1,2) = VP(RHQ(11)*DELTL)
01 7760 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7770 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7780 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7790 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7800 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7810 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7820 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7830 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7840 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7850 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7860 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7870 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7880 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7890 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7900 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7910 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7920 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7930 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7940 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7950 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7960 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7970 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7980 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 7990 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8000 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8010 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8020 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8030 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8040 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8050 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8060 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8070 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8080 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8090 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8100 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8110 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8120 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8130 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8140 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8150 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8160 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8170 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8180 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8190 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8200 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8210 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8220 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8230 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8240 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8250 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8260 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8270 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8280 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8290 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8300 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8310 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8320 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8330 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8340 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8350 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8360 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8370 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8380 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8390 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8400 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8410 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8420 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8430 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8440 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8450 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8460 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8470 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8480 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8490 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8500 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8510 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8520 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8530 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8540 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8550 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8560 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8570 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8580 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8590 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8600 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8610 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8620 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8630 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8640 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8650 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8660 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8670 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8680 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8690 C92PHQ(1,2) = VP(RHQ(33)*DELTL)
01 8700 C92PHQ
```

```

115      IF (IPC(12).NE.0) CALL GOUT(12)
      CALL POSVEL
      INIT=1
      RETURN
      END

```

01 37 29  
01 34 39  
01 20 10  
01 20 29  
01 39 39

**SYNOPSIS**

**SINIO**

**1. INTRODUCTION**

[illegible]

VARIABLES	SM	TYPE	RELOCATION	PI	PLTIME	REAL	CONTROL
142 OV92P	REAL	ARRAY	NAV	3	PT	REAL	UNIVSL
5 PLOTIM	REAL	INPUTS	INPUTS	2	PLTIME	REAL	CONTROL
6 PCHT	REAL	INPUTS	INPUTS	1	PLTIME	REAL	UNIVSL
216 22P95	REAL	ARRAY	NAV	11	BARPER	REAL	UNIVSL
0 QESIO	REAL	ARRAY	IMUNAT	11	PFSO	REAL	UNIVSL
17 RHO	REAL	ARRAY	NAV	3	PFSO	REAL	UNIVSL
65 RSMAX	REAL	INPUTS	INPUTS	3	PFSO	REAL	CONTROL
7 PSTOT	REAL	INPUTS	INPUTS	2	PFSO	REAL	UNIVSL
76 SALT	REAL	NAV	NAV	23	SALFOT	REAL	TPAJIM
13 SGT	REAL	ARRAY	TPAJIM	15	SCJIP	REAL	IMUNAT
21 SLAT9T	REAL	TPAJIM	TPAJIM	62	SSX0	REAL	INPUTS
63 SSY0	REAL	INPUTS	INPUTS	64	SSZ0	REAL	INPUTS
7 STAP	REAL	INPUTS	INPUTS	4	STOP	REAL	NAV
145 S2PHI	REAL	NAV	NAV	63	THIC02	REAL	NAV
55 THIER	REAL	ARRAY	NAV	63	THI120	REAL	NAV
0 TIME	REAL	TPAJIM	TPAJIM	17	TIME0	REAL	TPAJIM
13 TOLJRK	REAL	INPUTS	INPUTS	4	TOZEV	REAL	CONTROL
1 TOUNT	REAL	INPUTS	INPUTS	42	TOZSIO	REAL	IMUNAT
104 V0HP	REAL	NAV	NAV	2	V0UANT	REAL	INPUTS
10 V9T	REAL	TPAJIM	TPAJIM	107	V92	REAL	NAV
11 V92P	REAL	ARRAY	NAV	7	W92T	REAL	UNIVSL
12 W	REAL	TPAJIM	TPAJIM	65	XH	REAL	NAV
125 XCALF	REAL	NAV	NAV	152	YH	REAL	NAV
124 XSALF	REAL	NAV	NAV	145	YS2PHI	REAL	NAV
147 XV92P	REAL	ARRAY	NAV	126	Y0P92P	REAL	NAV

EXTERNALS	TYPE	APGS	DCQUED	REAL	CONTROL
ANGVL2	5		9		
OUT	1		3		
OPTHO	1		0		
TOPCOP	2		1	REAL	
V0W	3		1	REAL	
V0ZYX	7		1	REAL	

STATEMENT LABELS	202	450	520
177 410			0
40 522	316	550	332 600

LOOPS	LABFL	INDEX	FROM-TO	LENGTH	PROPERTIES
264 520	* I	89 92	240		EXT REFS NOT INNER
255 520	* J	90 92	208		EXT REFS

COMMON BLOCKS	LENGTH
CONTROL	9
IMUNAT	67
INPUTS	56
NAV	192
PCPAP	7
TPAJIM	21
UNIVSL	10

STATISTICS	5718	377
PROGRAM LENGTH	5718	377
COMMON LENGTH	5408	352

```

1      SUBROUTINE AITFIL
2      C
3      C THIS ROUTINE IS A MULTIPLE FIXED GAIN FILTER THAT IS APPLIED
4      C TO THE ALTITUDE DATA. ALTITUDE AND ITS FIRST AND SECOND
5      C DERIVATIVES ARE THE STATE VARIABLES
6      C
7      C IMPLICIT REAL(4-L-7)
8      C COMMON /INPUTS/ ANQUANT,
9      C 1 STOP, PLOTIM,
10     C 2 GAIN2, GAIN3,
11     C 2 ITIMAV, ITRATT,
12     C 3 IPR(3), IOPMLF,
13     C 4 QSMAX, QRSMAX,
14     C COMMON /NAV/ GPR92P(3,3), V92P(3),
15     C 1 GPR90(3,3), A(3,3),
16     C 2 ITRCO(3), XW(3),
17     C 3 SALF, GOLF,
18     C 4 LAT, LONG,
19     C 5 XSALF, XCALF,
20     C 6 S2PHI, X22PHI,
21     C 7 C910(3,3), C9P90(3,3), OH8,
22     C 8 ODX, ODY, OZ,
23     C 9 GAINS(3,10), IGAINP(3)
24     C DIMENSION FILTP(3)
25     C FILTER ARE FILTER RESIDUALS
26     C IF IPR(2)=.EQ. 0) RETURN
27     C IF FILTER NOT ACTIVATED, RETURN
28     C IF VPIR(3)=DELTA
29     C DISQ2=VPIR(3)*NT)*.5 )
30     C
31     C EXTRAPOLATE NEW STATE VECTOR, FIND THIS CYCLE'S RESIDUALS
32     C SELECT GAINS AND UPDATE STATE VECTOR. THE STATE VECTOR
33     C HERE IS THE ALTITUDE AND ITS FIRST AND SECOND DERIVATIVE.
34     C
35     C NO 900 J=1,3
36     C LOOP OVER PCLL PITCH AND YAW
37     C A(1,J)=VP(VPIR(1,J)+VP(FILATT(2,J)+NT)) + VP(FILATT(3,J)+DISQ2)
38     C
39     C A(2,J)=VP(FILATT(2,J)+VP(FILATT(3,J)+NT))
40     C A(3,J)=FILATT(3,J)
41     C A IS NOW EXTRAPOLATED STATE VECTOR
42     C FILTP(J)=VP(A(1,J)-A(1,J))
43     C RESIDUALS
44     C IF (ANS(FILTP(J)) .GE. QSMAX) GO TO 300
45     C IF RESIDUALS ARE TOO BIG, WANT TO MOVE GAINS POINTER LEFT
46     C WHICH IMPLIES LESS RELIANCE ON PREVIOUS VALUES
47     C OF THE STATE VECTOR
48     C IF (ANS(VP(FILTP(J)-FILTP(J))) .GE. QRSMAX) GO TO 300
49     C IF CHANGE OF RESIDUALS TOO BIG, MOVE GAIN POINTER LEFT
50     C ELSE MOVE GAIN POINTER RIGHT
51     C K=IGATMP(J)+1
52     C IF (K .GT. 10) K=10
53     C GO TO 400
54     C 300 K=IGATMP(J)-1
55     C IF (K .LT. 1) GO TO 400
56     C

```

K=1

014433

PAGE 2

05/25/76 17.17.47

FIN.4.5+2406

SUBROUTINE ALIEL 7A274 QBI=0 IPAGE

014433  
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014433

A(3,J)=0.  
C DISCARD FIRST AND SECOND DERIVATIVES

400 IGAINP(J)=K

DELTA(J)=DELTA(J)

DO 900 I=1,3

900 FILATEL(J)=V27A(I,J)+VR(GAINS(I,K))\*FILTR(J))

C UPDATE STATE VECTOR

RTURN

END

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS

1 ATIFIL

VARIABLES	SN	TYPE	RELOCATION	75	ALPHA	REAL	ARRAY	NAV	INPUTS	REAL	ARRAY	NAV	INPUTS
77 A	77	REAL	NAV	10	CV01	REAL		NAV	INPUTS	REAL		NAV	INPUTS
77 CALF	77	REAL	NAV	10	CV01	REAL		NAV	INPUTS	REAL		NAV	INPUTS
11 CV02	11	REAL	NAV	12	CV03	REAL		NAV	INPUTS	REAL		NAV	INPUTS
155 COP90	155	REAL	NAV	0	CONOPP	REAL		NAV	INPUTS	REAL		NAV	INPUTS
154 CC913	154	REAL	NAV	177	CC95	REAL		NAV	INPUTS	REAL		NAV	INPUTS
192 C9PH0	192	REAL	NAV	153	DELH	REAL		NAV	INPUTS	REAL		NAV	INPUTS
192 DFLY	192	REAL	NAV	123	DELTA	REAL		NAV	INPUTS	REAL		NAV	INPUTS
56 D054X	56	REAL	NAV	172	DT	REAL		NAV	INPUTS	REAL		NAV	INPUTS
173 DTSQ2	173	REAL	NAV	210	DV592P	REAL		NAV	INPUTS	REAL		NAV	INPUTS
14 DV92P	14	REAL	NAV	101	F14	REAL		NAV	INPUTS	REAL		NAV	INPUTS
112 FILATT	112	REAL	NAV	177	FILTP	REAL		NAV	INPUTS	REAL		NAV	INPUTS
225 GAINS	225	REAL	NAV	71	G92P	REAL		NAV	INPUTS	REAL		NAV	INPUTS
74 H	74	REAL	NAV	15	H50ING	REAL		NAV	INPUTS	REAL		NAV	INPUTS
14 H50TIM	14	REAL	NAV	137	HV92P	REAL		NAV	INPUTS	REAL		NAV	INPUTS
176 I	176	INTEGER	NAV	22	IE9LIM	INTEGER		NAV	INPUTS	INTEGER		NAV	INPUTS
261 IGATNP	261	INTEGER	NAV	21	IMUTYP	INTEGER		NAV	INPUTS	INTEGER		NAV	INPUTS
20 INCOP	20	INTEGER	NAV	61	IO9HLP	INTEGER		NAV	INPUTS	INTEGER		NAV	INPUTS
24 IPC	24	INTEGER	NAV	17	IT9ATT	INTEGER		NAV	INPUTS	INTEGER		NAV	INPUTS
57 ITREIL	57	INTEGER	NAV	16	IT9NAV	INTEGER		NAV	INPUTS	INTEGER		NAV	INPUTS
174 J	174	INTEGER	NAV	175	K	INTEGER		NAV	INPUTS	INTEGER		NAV	INPUTS
105 LAT	105	REAL	NAV	105	LONG	REAL		NAV	INPUTS	REAL		NAV	INPUTS
213 ONY	213	REAL	NAV	214	ONY	REAL		NAV	INPUTS	REAL		NAV	INPUTS
215 OFZ	215	REAL	NAV	222	OFILTR	REAL		NAV	INPUTS	REAL		NAV	INPUTS
176 OHK	176	REAL	NAV	142	OV92P	REAL		NAV	INPUTS	REAL		NAV	INPUTS
5. PLOTIM	5	REAL	NAV	5	P9PT	REAL		NAV	INPUTS	REAL		NAV	INPUTS
216 Q2P95	216	REAL	NAV	17	PHO	REAL		NAV	INPUTS	REAL		NAV	INPUTS
65 Q5MAX	65	REAL	NAV	7	P9PT	REAL		NAV	INPUTS	REAL		NAV	INPUTS
74 SALE	74	REAL	NAV	62	SEVO	REAL		NAV	INPUTS	REAL		NAV	INPUTS
63 S5Y0	63	REAL	NAV	64	SEZO	REAL		NAV	INPUTS	REAL		NAV	INPUTS
4 STAPT	4	REAL	NAV	4	STAP	REAL		NAV	INPUTS	REAL		NAV	INPUTS
145 S2PHI	145	REAL	NAV	63	THICOR	REAL		NAV	INPUTS	REAL		NAV	INPUTS
55 THIEPT	55	REAL	NAV	60	THITPO	REAL		NAV	INPUTS	REAL		NAV	INPUTS
13 TOLJPK	13	REAL	NAV	1	TQUAN	REAL		NAV	INPUTS	REAL		NAV	INPUTS
104 V940	104	REAL	NAV	2	V94ANT	REAL		NAV	INPUTS	REAL		NAV	INPUTS
107 W94	107	REAL	NAV	1	W94P	REAL		NAV	INPUTS	REAL		NAV	INPUTS

SUBROUTINE AIEEE 74724 OPIER IPAGE FIN 4.549426

VARIABLES SN TYPE RELOCATION  
 152 VH REAL NAV  
 145 XS2PHI REAL NAV  
 176 XDP92P REAL ARPAV NAV

EXTERNALS TYPE ARGS  
 VP REAL 1

INLINE FUNCTIONS TYPE ARGS  
 ARS REAL 1 INTRIN

STATEMENT LABELS 112 300 124 403 0 900

LOOPS LABEL INDEX FROM-TO LENGTH PROPERTIES  
 29 900 \* J 35 63 113R EXT DEFS NOT INTRIN  
 131 900 \* I 62 63 20R EXT DEFS

COMMON BLOCKS LENGTH  
 INPUTS 56  
 NAV 142

STATISTICS  
 PROGRAM LENGTH 2020 130  
 CM LABELER COMMON LENGTH 3569 238

```

1      SUBROUTINE ORTHO(ARRAY)
      C
      C THIS ROUTINE ORTHONORMALIZES IS INPUT
      C
      IMPLICIT REAL(A-H),REAL(L-7)
      DIMENSION ARRAY(3,3),A(3,3),B(3,3)
      CALL VMTH(A,ARRAY,ARRAY)
      DO 525 I=1,3
      525 A(I,I) = VP(A(I,I) - 1.0)
      CALL VMTH3(ARRAY,AA)
      DO 530 I=1,3
      530 A(I,I) = VP(A(I,I) - VP(0.5*VP(I,J)))
      RETURN
      END
15

```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
3 ORTHO

VARIABLES	SN	TYPE	RELOCATION	0	ARRAY	PFAL	ARRAY	F.P.
193 A		REAL	ARRAY	101	I	INTEGER		
114 B		REAL	ARRAY					
102 J		INTEGER						

EXTERNALS	TYPE	ARGS	VMTH	3
VMH	REAL	1		
VP	REAL	1		

STATEMENT LABELS  
0 525 0 530

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT REFS	EXT REFS	EXT REFS	EXT REFS
21	525	* I	8 9	118					
35	530	* I	11 13	239					
36	530	* J	12 13	208					

STATISTICS  
PROGRAM LENGTH 1303 89



```

1      SUBROUTINE DCUPD(DCM,DX,DY,DZ,IOZM1,DIAG,ODX,ODY,ODZ)
2      IMPLICIT REAL*8(D,X,Y,Z)
3
4      THIS ROUTINE CONSIDERS A DCM UPDATE MATRIX. THE INPUTS
5      ARE THE ROTATIONS ASSIGNED TO BE THE ELEMENTAL ROTATIONS
6      IN NO PARTICULAR ORDER. THE ROTATIONS FROM
7      THE PREVIOUS CYCLE, THE ORDER OF THE ROTATION MINUS 1
8      (THAT IS 2 MEANS FIRST ORDER, 1 MEANS SECOND ORDER,
9      ANYTHING ELSE MEANS THIRD ORDER), AND THE VALUE OF THE
10     EITHER 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 1350, 1351, 1352, 1353, 1354, 1355, 1356, 1357, 1358, 1359, 1360, 1361, 1362, 1363, 1364, 1365, 1366, 1367, 1368, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378, 1379, 1380, 1381, 1382, 1383, 1384, 1385, 1386, 1387, 1388, 1389, 1390, 1391, 1392, 1393, 1394, 1395, 1396, 1397, 1398, 1399, 1400, 1401, 1402, 1403, 1404, 1405, 1406, 1407, 1408, 1409, 1410, 1411, 1412, 1413, 1414, 1415, 1416, 1417, 1418, 1419, 1420, 1421, 1422, 1423, 1424, 1425, 1426, 1427, 1428, 1429, 1430, 1431, 1432, 1433, 1434, 1435, 1436, 1437, 1438, 1439, 1440, 1441, 1442, 1443, 1444, 1445, 1446, 1447, 1448, 1449, 1450, 1451, 1452, 1453, 1454, 1455, 1456, 1457, 1458, 1459, 1460, 1461, 1462, 1463, 1464, 1465, 1466, 1467, 1468, 1469, 1470, 1471, 1472, 1473, 1474, 1475, 1476, 1477, 1478, 1479, 1480, 1481, 1482, 1483, 1484, 1485, 1486, 1487, 1488, 1489, 1490, 1491, 1492, 1493, 1494, 1495, 1496, 1497, 1498, 1499, 1500, 1501, 1502, 1503, 1504, 1505, 1506, 1507, 1508, 1509, 1510, 1511, 1512, 1513, 1514, 1515, 1516, 1517, 1518, 1519, 1520, 1521, 1522, 1523, 1524, 1525, 1526, 1527, 1528, 1529, 1530, 1531, 1532, 1533, 1534, 1535, 1536, 1537, 1538, 1539, 1540, 1541, 1542, 1543, 1544, 1545, 1546, 1547, 1548, 1549, 1550, 1551, 1552, 1553, 1554, 1555, 1556, 1557, 1558, 1559, 1560, 1561, 1562, 1563, 1564, 1565, 1566, 1567, 1568, 1569, 1570, 1571, 1572, 1573, 1574, 1575, 1576, 1577, 1578, 1579, 1580, 1581, 1582, 1583, 1584, 1585, 1586, 1587, 1588, 1589, 1590, 1591, 1592, 1593, 1594, 1595, 1596, 1597, 1598, 1599, 1600, 1601, 1602, 1603, 1604, 1605, 1606, 1607, 1608, 1609, 1610, 1611, 1612, 1613, 1614, 1615, 1616, 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1632, 1633, 1634, 1635, 1636, 1637, 1638, 1639, 1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647, 1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655, 1656, 1657, 1658, 1659, 1660, 1661, 1662, 1663, 1664, 1665, 1666, 1667, 1668, 1669, 1670, 1671, 1672, 1673, 1674, 1675, 1676, 1677, 1678, 1679, 1680, 1681, 1682, 1683, 1684, 1685, 1686, 1687, 1688, 1689, 1690, 1691, 1692, 1693, 1694, 1695, 1696, 1697, 1698, 1699, 1700, 1701, 1702, 1703, 1704, 1705, 1706, 1707, 1708, 1709, 1710, 1711, 1712, 1713, 1714, 1715, 1716, 1717, 1718, 1719, 1720, 1721, 1722, 1723, 1724, 1725, 1726, 1727, 1728, 1729, 1730, 1731, 1732, 1733, 1734, 1735, 1736, 1737, 1738, 1739, 1740, 1741, 1742, 1743, 1744, 1745, 1746, 1747, 1748, 1749, 1750, 1751, 1752, 1753, 1754, 1755, 1756, 1757, 1758, 1759, 1760, 1761, 1762, 1763, 1764, 1765, 1766, 1767, 1768, 1769, 1770, 1771, 1772, 1773, 1774, 1775, 1776, 1777, 1778, 1779, 1780, 1781, 1782, 1783, 1784, 1785, 1786, 1787, 1788, 1789, 1790, 1791, 1792, 1793, 1794, 1795, 1796, 1797, 1798, 1799, 1800, 1801, 1802, 1803, 1804, 1805, 1806, 1807, 1808, 1809, 1810, 1811, 1812, 1813, 1814, 1815, 1816, 1817, 1818, 1819, 1820, 1821, 1822, 1823, 1824, 1825, 1826, 1827, 1828, 1829, 1830, 1831, 1832, 1833, 1834, 1835, 1836, 1837, 1838, 1839, 1840, 1841, 1842, 1843, 1844, 1845, 1846, 1847, 1848, 1849, 1850, 1851, 1852, 1853, 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 218
```

015211

DCM(2,1)=VP(DCM(2,1)-VP(VP(SCL\*Z2)+I1))

2

PAGE

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FTN 4.548406

SUBROUTINE DCMUPD 74274 DPEID TRACE

015220  
015230  
015240  
015250  
015260  
015270  
015280  
015290  
015300  
015310

DCM(1,2)=VP(DCM(1,2)+VP(VP(SCL\*OZ)-I1))  
DCM(3,1)=VP(DCM(3,1)+VP(VP(SCL\*OY)-I2))  
DCM(1,3)=VP(DCM(1,3)+VP(VP(SCL\*OY)+I2))  
DCM(2,3)=VP(DCM(2,3)+VP(VP(SCL\*OX)-I1))  
DCM(3,2)=VP(DCM(3,2)+VP(VP(SCL\*OX)+I1))

510 ODX=OX  
OYV=OY  
OYZ=OZ  
PFIUPH  
END

65

CARD NO. 75VFOIY DETAILS DIAGNOSIS OF PROBLEM

56 I CONSTANT TOO LONG. HIGH ORDER DIGITS RETAINED, BUT SOME PRECISION LOST.

1-64

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
3 DCMUPD

VARIABLES	SH	TYPE	RELOCATION	OTAG	REAL	F.P.
0 DCM		REAL	APRAY	3	NY	REAL
0 OX		REAL		3	IOZNP1	REAL
0 OY		REAL		3	OY	REAL
0 ODX		REAL		353	SCL	REAL
0 OYZ		REAL		343	S2	REAL
342 S1		REAL		345	I1	REAL
346 S3		REAL		347	I3	REAL
346 I2		REAL				

EXTERNALS  
VP TYPE - ARGS  
REAL 1

STATEMENT LABELS  
0 500 INACTIVE 320 510

STATISTICS  
PROGRAM LENGTH 3510 233



```

SUBROUTINE MATVEC
  SUBROUTINE MATVEC(0,0,C)
  SUBROUTINE TO MULTIPLY A VECTOR BY A MATRIX
  FORM IS:
  D = B * C
  D = 1X3 VECTOR
  B = 3X3 MATRIX
  C = 1X3 VECTOR
  IMPLICIT REAL(A-H,L-Z)
  DIMENSION A(3),B(3,3),C(3),D(3)
  DO 20 I=1,3
    A(I) = 0.0
  DO 20 J=1,3
    B(I,J) = A(I) + B(I,J)*C(J)
  DO 22 I=1,3
    D(I) = A(I)
  RETURN
  END
  
```

1-66

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
3 MATVEC

VARIABLES	SN	TYPE	PELOCATION	REAL	ARRAY	F.P.	REAL	ARRAY	F.P.
12 A		REAL	ARRAY	0	0				
0 C		REAL	ARRAY	0	0				
40 I		INTEGER		41	J				

STATEMENT LABELS  
0 26 0 22

LOOPS	LABL	INDEX	FROM-TO	LENGTH	PROPERTIES
16	20	I	15 18	148	NOT INNER
21	20	J	17 18	78	INSTACK
33	22	I	19 20	48	INSTACK

STATISTICS  
PROGRAM LENGTH 538 43



```

1  SUBROUTINE MM(O,P,C)
   IMPLICIT REAL(A-H,L-Z)
   DIMENSION A(1,3),C(3,3),C(3,3),O(3,3)
   DO 12 I=1,3
     DO 10 J=1,3
       A(I,J) = 0.0
     DO 10 K=1,3
       --10 A(I,J) = A(I,J) + O(I,K)*C(K,J)
     DO 12 J=1,3
       12 A(I,J) = A(I,J)
   RETURN
   END

```

SYMBOLIC REFERENCE MAP (P=1)

ENTRY POINTS

VARIABLES	SN	TYPE	RELOCATION	REAL	ARRAY	F.P.	REAL	ARRAY	F.P.
1 56 A		REAL	ARRAY						
1 3 C		REAL	ARRAY						
53 I		INTEGER							
55 K		INTEGER							

STATEMENT LABELS

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
16	12	I	4 8	228	NOT INNER
17	16	J	5 8	178	NOT INNER
23	10	K	7 8	108	OPT
41	12	I	9 11	118	NOT INNER
42	12	J	10 11	68	INSTACK

STATISTICS

PROGRAM LENGTH 758 61

```

1      SUBROUTINE ROTXYZ(ARAY,S7,CZ,SY,CY, SX,CX)
      C
      C THIS ROUTINE FORMS THE ROTATION MATRIX THAT ACTS ON AN X-Y-Z
      C COLUMN VECTOR AS SPECIFIED BY THREE Euler ROTATIONS. FIRST
      C ROTATION IS MINUS 7 DEGREES ABOUT Z, THEN MINUS Y ABOUT Y,
      C THEN X DEGREES ABOUT X. THE INPUTS ARE THE SINES AND COSINES OF
      C 7,Y, AND X DEGREES. THE RESULT IS STORED IN ARAY.
      C
      C IMPLICIT REAL(A-H,I-Z)
      C DIMENSION ARAY(3,3)
      C SVSZ = SY*SZ
      C SVSZ = SY*SZ
      C ARAY(1,1) = CX*CZ - SX*SVSZ
      C ARAY(2,1) = -SX*CZ - CX*SVSZ
      C ARAY(3,1) = CX*SZ + SX*SVSZ
      C ARAY(1,2) = CX*SZ + SX*SVSZ
      C ARAY(2,2) = -SX*CZ - CX*SVSZ
      C ARAY(3,2) = CX*SZ + SX*SVSZ
      C ARAY(1,3) = SY
      C ARAY(2,3) = CX*CY
      C ARAY(3,3) = CX*CY
      C RETURN
      C END

```

*insert this code*

**[ ARAY(1,2) = -CY\*SZ ]**

1-69

## SYMBOLIC REFERENCE MAP (R=1)

## ENTRY POINTS

3 ROTXYZ

VARIABLES	SN	TYPE	RELOCATION
1 ARAY		REAL	ARAY
0 CY		REAL	F.P.
0 SX		REAL	F.P.
46 SVSZ		REAL	F.P.
0 SZ		REAL	F.P.

0 CX	0 CZ	0 SY	47 SVSZ
REAL	REAL	REAL	REAL

F.P.  
F.P.  
F.P.

## STATISTICS

SOURCE LENGTH

508 40





```

1      C      SUBROUTINE ROTZYX(A,2AY,SZ,CZ,SY,CY,CX,SY,CX)
          C      THIS ROUTINE FORMS THE ROTATION MATRIX THAT ACTS ON AN X-Y-Z
          C      VECTOR. THE ROTATION IS SPECIFIED BY THREE EULER ANGLES. EIPSI
          C      ROTATION IS ABOUT X, NEXT ABOUT Y, THEN ABOUT Z. THE INPUTS
          C      ARE THE SINES AND COSINES OF THE ROTATION ANGLES. THE OUTPUT IS
          C      IN ARRAY
          C
          C      IMPLICIT REAL (A-H,I-Z)
          C      DIMENSION ARRAY(3,3)
          C      SYCX=SY*CX
          C      SYCZ=SY*CZ
          C      ARRAY(1,1)=CY*CZ
          C      ARRAY(1,2)=-SZ*CY
          C      ARRAY(1,3)=SY
          C      ARRAY(2,1)=SYCX*CZ+SZ*CX
          C      ARRAY(2,2)=-SYCX*SZ+CY*CX
          C      ARRAY(3,1)=CY*SY
          C      ARRAY(3,2)=-CY*SZ
          C      ARRAY(3,3)=SZ*SYCX+SY*CZ
          C      RETURN
          C      END
015661
015670
015680
015690
015700
015710
015720
015730
015740
015750
015760
015770
015780
015790
015800
015810
015820
015830
015840
015850
015860
015870
015880
015890

```

SYMBOLIC REFERENCE MAP (P=1)

ENTRY POINTS  
3 ROTZYX

VARIABLES	SN	TYPE	RELOCATION	ARRAY	F.P.	REAL	F.P.
0 APPAY		REAL					
0 CY		REAL					
0 SX		REAL					
52 SYCX		REAL					
0 SZ		REAL					

STATISTICS  
PROGRAM LENGTH 530 43





05/25/76 17.12.47

FIN 4.5+R405

74/74 OPI=0 IPAGE

SUBROUTINE VMIM

77

115R

STATISTICS  
PROGRAM LENGTH

```

1  SUBROUTINE VMH(O,B,C)
   IMPLICIT REAL(A-H,L-Z)
   DIMENSION A(3,3),C(3,3),O(3,3)
   DO 10 I=1,3
     DO 10 J=1,3
       A(I,J) = 0.0
       DO 10 K=1,3
         10 A(I,J) = VP(O(I,K)*C(K,J))
       DO 12 I=1,3
         DO 12 J=1,3
           12 A(I,J) = A(I,J)
         RETURN
       END

```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS

1... VMH

VARIABLES	SN	TYPE	RELOCATION	REAL	APRAY	APRAY	F.P.
75 A		REAL	ARRAY	0 B	REAL	APRAY	F.P.
73 C		REAL	ARRAY	0 D	REAL	APRAY	F.P.
75 K		INTEGER	INTEGER	74 J	INTEGER		

EXTERNALS	TYPE	ARGS
VP	REAL	1

STATEMENT LABELS

0 10 12 0 12

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT DEFS	NOT INNER
16	10	I	4 8	349		EXT DEFS	NOT INNER
17	10	J	5 8	310		EXT DEFS	NOT INNER
23	10	K	7 8	220		EXT DEFS	NOT INNER
53	12	I	9 11	110		NOT INNER	
54	12	J	10 11	60	INSTACK		

STATISTICS

PROGRAM LENGTH 1159 77

```

1 SURROUTINE VPZYX(ARRAY,S7,CZ,SY,CY, SX,CX)
C
C THIS ROUTINE FORMS THE ROTATION MATRIX THAT ACTS ON AN X-Y-Z
C VECTOR. THE ROTATION IS SPECIFIED BY THREE EULER ANGLES. FIRST
5 C ROTATION IS ABOUT X, NEXT ABOUT Y, THEN ABOUT Z. THE INPUTS
C ARE THE SINSES AND COSINES OF THE ROTATIONS ANGLES. THE OUTPUT IS
C IN ARRAY
C
C IMPLICIT REAL(A-H,I-L-Z)
C DIMENSION ARRAY(3,3)
C SYX=VP(SY*SX)
C SVCX=VP(SY*CX)
C ARRAY(1,1)=VP(CY*CZ)
C ARRAY(2,1)=-VP(SZ*CY)
C ARRAY(3,1)=SV
C ARRAY(1,2)=VZ(VP(SYX*CZ)+VP(SZ*CX))
C ARRAY(2,2)=VP(VP(-SYX*SZ)+VP(CZ*CX))
C ARRAY(3,2)=-VP(CY*SX)
C ARRAY(1,3)=VP(VP(-CZ*SVCX)+VP(SZ*SYX))
C ARRAY(2,3)=VP(VP(SZ*SVCX)+VP(SX*CY))
C ARRAY(3,3)=VP(CY*CX)
C RETURN
END

```

## SYMBOLIC REFERENCE MAP (R=1)

### ENTRY POINTS

XAZIYA  
VETZYX

VARIABLES		SM	TYPE	RELOCATION		
0	APRAY		REAL	ARRAY	F.P.	
0	GY		REAL		F.P.	0 CX
0	SX		REAL		F.P.	0 C7
145	SYCX		REAL			0 SY
0	SZ		REAL			144 SYSX

EXTERNALS	TYPE	ARGS
VP	REAL	1

SYATISICS	1460	102
PROGRAM LENGTH		

```

1      SUBROUTINE VPIXYZ (ARRAY, SZ, CZ, SY, CY, SX, CX)
      C
      C THIS ROUTINE FORMS THE ROTATION MATRIX THAT ACTS ON AN X-Y-Z
      C COLUMN VECTOR AS SPECIFIED BY THREE FULLER ROTATIONS. FIRST
      C ROTATION IS MINUS Z DEGREES ABOUT Z, THEN MINUS Y ABOUT Y,
      C THEN X DEGREES ABOUT X. THE INPUTS ARE THE SINES AND COSINES OF
      C Z, Y, AND X DEGREES. THE RESULT IS STORED IN ARRAY.
      C
      C IMPLICIT REAL*8 (A-H,L-Z)
      DIMENSION ARX(3,3)
      SYCZ = VP(SY*CZ)
      SYCZ = VP(SY*CZ)
      SYCZ = VP(SY*CZ)
      ARX(1,1) = VP(CY*CZ)
      ARX(2,1) = VP(VP(CX*SZ) - VP(SX*SYCZ))
      ARX(3,1) = VP(VP(-SX*SZ) - VP(CX*SYCZ))
      ARX(1,2) = -VP(CY*SZ)
      ARX(2,2) = VP(VP(CX*CZ) + VP(SX*SYCZ))
      ARX(3,2) = VP(VP(-SX*CZ) + VP(CX*SYCZ))
      ARX(1,3) = SY
      ARX(2,3) = VP(SX*CY)
      ARX(3,3) = VP(CX*CY)
      RETURN
      END

```

SYMBOLIC REFERENCE MAP (P=1)

ENTRY POINTS  
3 VPIXYZ

VARIABLES	SN	TYPE	RELOCATION			
7 ARRAY		REAL	ARRAY		0 CX	REAL
0 CY		REAL			0 CZ	REAL
0 SY		REAL			0 SY	REAL
140 SYCZ		REAL			141 SYCZ	REAL
0 SZ		REAL				

EXTERNALS  
1

STATISTICS  
PROGRAM LENGTH 1428 98





013179  
019343  
019369  
019389

ETAGP(2)=0.  
IF (IPR(2).NE.0) CALL DOUT(2)  
RETURN  
END

SYMBOLIC REFERENCE MAP (P=1)

ENTR9 POINTS  
1 SSATUN

VARIABLES	SN	TYPE	RELOCATION	ALFOT	REAL	IPAJIN
33 A		REAL	NAV	0	REAL	IPAJIN
75 ALPHA		REAL	NAV	44	REAL	IPAJIN
100 APESIO		REAL	NAV	24	REAL	IPAJIN
77 CALF		REAL	NAV	10	REAL	IPAJIN
22 CLAT9T		REAL	IPAJIN	12	REAL	IPAJIN
11 CV02		REAL	IPAJIN	12	REAL	IPAJIN
155 CUP90		REAL	IPAJIN	12	REAL	IPAJIN
156 CUP91		REAL	IPAJIN	12	REAL	IPAJIN
45 C1000		REAL	IPAJIN	177	REAL	IPAJIN
20 C2P95		REAL	IPAJIN	56	REAL	IPAJIN
31 C9MIS		REAL	IPAJIN	67	REAL	IPAJIN
153 DELTA		REAL	IPAJIN	22	REAL	IPAJIN
127 DELTA		REAL	IPAJIN	193	REAL	IPAJIN
46 OPSMAX		REAL	IPAJIN	15	REAL	IPAJIN
143 THP2		REAL	IPAJIN	154	REAL	IPAJIN
3 UV4P		REAL	IPAJIN	210	REAL	IPAJIN
4 EF		REAL	IPAJIN	14	REAL	IPAJIN
5 ESQ		REAL	IPAJIN	5	REAL	IPAJIN
6 ETAGP		REAL	IPAJIN	101	REAL	IPAJIN
112 FILATT		REAL	IPAJIN	5	REAL	IPAJIN
71 G02P		REAL	IPAJIN	225	REAL	IPAJIN
4 H		REAL	IPAJIN	74	REAL	IPAJIN
15 HGTINC		REAL	IPAJIN	1	REAL	IPAJIN
137 HV02P		REAL	IPAJIN	14	REAL	IPAJIN
257 ISAINP		INTEGER	IPAJIN	22	INTEGER	IPAJIN
20 INCR		INTEGER	IPAJIN	21	INTEGER	IPAJIN
23 IPC		INTEGER	IPAJIN	61	INTEGER	IPAJIN
67 ITREFIL		INTEGER	IPAJIN	17	INTEGER	IPAJIN
105 LAT		REAL	IPAJIN	16	REAL	IPAJIN
106 LONG		REAL	IPAJIN	1	REAL	IPAJIN
2 LONG9T		REAL	IPAJIN	23	REAL	IPAJIN
214 ONV		REAL	IPAJIN	215	REAL	IPAJIN
222 OFILTR		REAL	IPAJIN	176	REAL	IPAJIN
141 OTH1		REAL	IPAJIN	153	REAL	IPAJIN
192 OV02P		REAL	IPAJIN	1	REAL	IPAJIN
5 PLOTTH		REAL	IPAJIN	5	REAL	IPAJIN
216 Q0005		REAL	IPAJIN	11	REAL	IPAJIN
3 Q0010		REAL	IPAJIN	11	REAL	IPAJIN
47 Q00		REAL	IPAJIN	3	REAL	IPAJIN
65 Q000X		REAL	IPAJIN	7	REAL	IPAJIN
11		REAL	IPAJIN	7	REAL	IPAJIN

VARIABLES	SN	TYPE	RELOCATION	21	SLATOT	REAL	TRAJIN
15 SF4P	REAL	IMUDAT	IMUDAT	63	SSYC	REAL	TRAJIN
62 SSX0	REAL	IMUDAT	IMUDAT	3	START	REAL	TRAJIN
64 SSZ0	REAL	IMUDAT	IMUDAT	145	SSPHI	REAL	NAV
4 STOP	REAL	IMUDAT	IMUDAT	63	THICOP	REAL	NAV
162 TFNP	REAL	IMUDAT	IMUDAT	63	THICOP	REAL	NAV
55 THERT	REAL	IMUDAT	IMUDAT	7	TH2	REAL	IMUDAT
6 TH1	REAL	IMUDAT	IMUDAT	11	TH6	REAL	IMUDAT
10 TH3	REAL	IMUDAT	IMUDAT	17	TH7	REAL	TRAJIN
0 TIM	REAL	IMUDAT	IMUDAT	1	THICOP	REAL	IMUDAT
13 ICLJCK	REAL	IMUDAT	IMUDAT	104	VOMP	REAL	NAV
42 TRFSTR	REAL	IMUDAT	IMUDAT	10	VIT	REAL	TRAJIN
2 VQUANT	REAL	IMUDAT	IMUDAT	11	V3P	REAL	NAV
107 V92	REAL	IMUDAT	IMUDAT	12	WT	REAL	IMUDAT
7 WRT	REAL	IMUDAT	IMUDAT	125	YCALF	REAL	NAV
66 W2V	REAL	IMUDAT	IMUDAT	124	XSLE	REAL	NAV
152 W4	REAL	IMUDAT	IMUDAT	147	XV3P	REAL	NAV
14F XSPHT	REAL	IMUDAT	IMUDAT				
126 XGP92P	REAL	IMUDAT	IMUDAT				

EXTERNALS	TYPE	ARGS	LIBRARY	CD	REAL	LIBRARY
ATM2	REAL	2	LIBRARY	CD	REAL	LIBRARY
DOUT	REAL	1	LIBRARY	CD	REAL	LIBRARY
INTZ	REAL	2	LIBRARY	CD	REAL	LIBRARY
SIN	REAL	1	LIBRARY	CD	REAL	LIBRARY

STATEMENT LABELS	70	5
63	1	5

COMMON BLOCKS	LENGTH
IMUDAT	67
NAV	192
UNVPSL	10
TRAJIN	21
IMUDAT	56

STATISTICS	1059	117
PROGRAM LENGTH	1059	117
CY LABELED COMMON LENGTH	5203	336

```

1      SUBROUTINE SSINTG
C      THIS ROUTINE TRANSFORMS THE VELOCITY INCREMENTS FROM
C      THE HANDED AZIMUTH FRAME TO THE SPACE STABLE FRAME
C
C      IMPLICIT REAL (A-H), DECIMAL (L-7)
COMMON /INPUTS/ AQUANT, TQUANT,
1  STOP, PLOTP, CUV3, TOLJPK,
2  IPR44V, TTRAT, TNGOF,
3  TPC(20), TOP4LP, SSKO,
4  PS4AX, DSS4AX, TTRIL
COMMON /IMUDET/ RFSID(3), RW3(3),
1  SF9TP(3), C2P95(3,3), C94IS(3,3),
2  C1092P(3,3), C2P95T(3,3), A25510(3)
COMMON /MAYV/ COP32P(3,3), V222(3),
1  C2RHO(3,3), A(3,3),
2  THFCOP(3), WV(3), G320(3),
3  SAE, CALF, DFL,
4  LAT, LONG, V32(3),
5  XCALF, V093P(3,3), WV920(3),
6  COP31(3,3), X32PHI,
7  C0910(3,3), COP33(3,3), Q43,
8  ONV, ONZ,
9  GAINS(3,3), IGAINP(3)
COMMON /TRAJIN/ ITML,
1  H3, FTAGT(3),
2  TIMED, LONGO,
3  CALC9T, SLAT9T,
COMMON /UNVERSL/ PI,
1  FF, FSQ,
2  FFCQ
C      DIMENSION TEMP(3)
TEMP(1)=1.0NGST+LONGO-WF9T*(TIME TIME0)
CALL POTVX(A, SIN(TEMP(1)), COS(TEMP(1)), SLAT9T, CLAT9T,
1  -SALE9T, CALC9T)
TEMP(1)=SF9T(3)
TEMP(2)=-SF9T(2)
TEMP(3)=SF9T(1)
CALL XN(C1092P, C1090, A)
IF (IPC(14).NE.0) CALL DOUT(14)
CALL MATVEC(SF9T, C1092P, TEMP)
C      RETURN
END

```

SYMBOLIC REFERENCE MAP (P=1)

ENTRY POINTS  
1 SSINTG

VARIAL'S SW TYPE LOCAL ARRAY LOCATION NAV

ALERT AS JOUR

TOTAL TIME

VARIABLES	SN	TYPE	RELOCATION	0	AMOUNT	REAL	INPUTS
109 APESTO	44	REAL	THUDAT	44	REAL	REAL	NAV
77 GALT	24	REAL	NAV	24	REAL	REAL	TPAJIN
22 CLAT9T	18	REAL	TRAJIN	18	REAL	REAL	INPUTS
11 CVD2	12	REAL	INPUTS	12	REAL	REAL	NAV
165 CDP90	0	REAL	NAV	0	REAL	REAL	NAV
154 G0910	177	REAL	NAV	177	REAL	REAL	NAV
45 G1090	56	REAL	IMUDAT	56	REAL	REAL	NAV
27 G2P95	67	REAL	IMUDAT	67	REAL	REAL	NAV
71 G9H1S	22	REAL	IMUDAT	22	REAL	REAL	NAV
153 JELM	120	REAL	NAV	120	REAL	REAL	NAV
121 JELTH	15	REAL	NAV	15	REAL	REAL	NAV
60 D05MAX	210	REAL	INPUTS	210	REAL	REAL	NAV
3 D09P	14	REAL	IMUDAT	14	REAL	REAL	NAV
4 EF	6	REAL	UNVPSL	6	REAL	REAL	NAV
5 E50	101	REAL	UNVPSL	101	REAL	REAL	NAV
6 ET49P	3	REAL	IMUDAT	3	REAL	REAL	NAV
112 ILATIT	225	REAL	NAV	225	REAL	REAL	NAV
71 G92P	74	REAL	NAV	74	REAL	REAL	NAV
4 H8	1	REAL	TRAJIN	1	REAL	REAL	NAV
15 H50INC	14	REAL	INPUTS	14	REAL	REAL	NAV
137 H992P	22	REAL	NAV	22	REAL	REAL	NAV
253 ICALMP	21	INTEGER	NAV	21	INTEGER	INTEGER	NAV
29 INCP	61	INTEGER	INPUTS	61	INTEGER	INTEGER	NAV
23 IPC	17	INTEGER	INPUTS	17	INTEGER	INTEGER	NAV
67 ITRFIL	16	INTEGER	INPUTS	16	INTEGER	INTEGER	NAV
105 LAT	1	REAL	NAV	1	REAL	REAL	NAV
175 LONG	21	REAL	NAV	21	REAL	REAL	NAV
2 LONG9T	213	REAL	TRAJIN	213	REAL	REAL	NAV
214 Q9Y	215	REAL	NAV	215	REAL	REAL	NAV
222 OFILT	176	REAL	NAV	176	REAL	REAL	NAV
162 OV92P	0	REAL	NAV	0	REAL	REAL	NAV
5 PLOTIM	6	REAL	INPUTS	6	REAL	REAL	NAV
216 P9P95	10	REAL	NAV	10	REAL	REAL	NAV
0 P9S12	11	REAL	IMUDAT	11	REAL	REAL	NAV
17 Q90	3	REAL	NAV	3	REAL	REAL	NAV
65 R5MAX	7	REAL	INPUTS	7	REAL	REAL	NAV
2 R	76	REAL	UNVPSL	76	REAL	REAL	NAV
23 SALT9T	13	REAL	TRAJIN	13	REAL	REAL	NAV
15 SF9TP	21	REAL	IMUDAT	21	REAL	REAL	NAV
62 SXX9	54	REAL	INPUTS	54	REAL	REAL	NAV
64 S57	3	REAL	INPUTS	3	REAL	REAL	NAV
4 STOP	145	REAL	INPUTS	145	REAL	REAL	NAV
63 THFP	63	REAL	NAV	63	REAL	REAL	NAV
50 THFT9T	63	REAL	NAV	63	REAL	REAL	NAV
0 TIME	17	REAL	TRAJIN	17	REAL	REAL	NAV
13 TOLJRK	1	REAL	INPUTS	1	REAL	REAL	NAV
42 T9S10	104	REAL	IMUDAT	104	REAL	REAL	NAV
2 VQUANT	10	REAL	INPUTS	10	REAL	REAL	NAV
107 V92	11	REAL	NAV	11	REAL	REAL	NAV
7 W92T	12	REAL	UNVPSL	12	REAL	REAL	NAV
66 W9V	126	REAL	NAV	126	REAL	REAL	NAV
152 XH	124	REAL	NAV	124	REAL	REAL	NAV
146 X92 4T	147	REAL	NAV	147	REAL	REAL	NAV
124 X992P		REAL	NAV		REAL	REAL	NAV

17.12.67

05/25/75

FIN 4.5+0428

SUBROUTINE STNIG 74/74 CPYEQ TRACE

EXTERNALS	TYPE	ARGS	REAL	IMAG	DEAL	LTAPRY
COS	REAL	1				
MAIVEC		1				
POIYX		7				

COMMON BLOCKS	LENGTH
INPUTS	56
IMUNAT	67
YAV	182
TOAJIN	21
UNVOSL	10

STATISTICS	PROGRAM LENGTH	CM LABELED COMMON LENGTH
	661	5203
		326



FILATT(1,1)=VP(ETAT(1))

019373

PAGE 2

17.12.47

FTN 4.5+24.05

SURPOUINE SSINIT 74/74 ORI=2.1405

019389  
019390  
019401  
019410

FILATT(1,2)=VP(ETAT(2))  
FILATT(1,3)=VP(ETAT(3))  
888 RETURN  
[END]

60

# SYMBOLIC REFERENCE MAP (P=1)

ENTRY POINTS  
1 SSINIT

VARIABLES	SN	TYPE	RELOCATION	3	ALERT	REAL	IRAJIN
33 A	REAL	ARRAY	NAV	0	ADJANT	REAL	IRAJIN
75 ALPHA	REAL	NAV	NAV	44	B	REAL	NAV
100 APESID	REAL	ARRAY	IMUDAT	24	CALCOT	REAL	TOAJTH
77 CALF	REAL	NAV	NAV	10	CVU1	REAL	IMUDAT
22 CLAT4T	REAL	IRAJIN	IRAJIN	12	CVU3	REAL	IMUDAT
11 CVU2	REAL	INPUTS	INPUTS	3	CVU3P	REAL	NAV
155 DDP90	REAL	NAV	NAV	177	C-35	REAL	NAV
154 CG910	REAL	ARRAY	NAV	56	C132P	REAL	IMUDAT
45 G1090	REAL	ARRAY	IMUDAT	67	C2005T	REAL	IMUDAT
20 C2095	REAL	ARRAY	IMUDAT	22	C2090C	REAL	NAV
31 COMTS	REAL	ARRAY	IMUDAT	101	CLT	REAL	NAV
157 DFLH	REAL	NAV	NAV	16	CLT	REAL	TOAJTH
123 GFLTA	REAL	NAV	NAV	210	CLT	REAL	NAV
66 GOSMAX	REAL	INPUTS	INPUTS	14	CLT	REAL	NAV
7 DV90	REAL	ARRAY	NAV	6	CLT	REAL	NAV
101 ETA	REAL	ARRAY	NAV	112	CLT	REAL	NAV
5 ETAGT	REAL	ARRAY	NAV	71	CLT	REAL	NAV
225 GAINS	REAL	ARRAY	NAV	4	CLT	REAL	NAV
74 H	REAL	NAV	NAV	14	CLT	REAL	NAV
15 HSOINC	REAL	NAV	NAV	216	CLT	REAL	NAV
17 HV900	REAL	ARRAY	NAV	13	CLT	REAL	NAV
7 ICNCL	INTEGER	NAV	NAV	263	CLT	REAL	NAV
20 IFLTH	INTEGER	INPUTS	INPUTS	21	CLT	REAL	NAV
21 IFLTH	INTEGER	INPUTS	INPUTS	61	CLT	REAL	NAV
5 INT	INTEGER	CONTROL	CONTROL	6	CLT	REAL	NAV
23 IPC	INTEGER	ARRAY	INPUTS	67	CLT	REAL	NAV
17 IPAT	INTEGER	INPUTS	INPUTS	217	CLT	REAL	NAV
16 ITHAV	INTEGER	INPUTS	INPUTS	1	CLT	REAL	NAV
105 LAT	REAL	NAV	NAV	29	CLT	REAL	NAV
106 LONG	REAL	NAV	NAV	213	CLT	REAL	NAV
214 ODY	REAL	NAV	NAV	216	CLT	REAL	NAV
222 OFILTR	REAL	ARRAY	NAV	175	CLT	REAL	NAV
7 OFILTR	REAL	NAV	NAV	142	CLT	REAL	NAV
5 OFILTR	REAL	CONTROL	CONTROL	1	CLT	REAL	NAV
216 OFILTR	REAL	INPUTS	INPUTS	8	CLT	REAL	NAV
17 OFILTR	REAL	NAV	NAV	65	CLT	REAL	NAV
7 OFILTR	REAL	NAV	NAV	7	CLT	REAL	NAV
75 OFILTR	REAL	NAV	NAV	14	CLT	REAL	NAV
12 OFILTR	REAL	NAV	NAV	14	CLT	REAL	NAV

```

1      SUBROUTINE SSIERN
2      COMMON /IMUCAT/ OESIO(3), OVAR(3), WT(3),
3      * HIS ROUTINE TRANSF AS THE VELOCITY INCREMENTS FROM THE IMU
4      * THAT IS, SPACE STABLE FRAME, IN THE CORP FRAME.
5      C
6      IMPLICIT REAL(A-H),REAL(L-Z)
7      COMMON /IMUCAT/ OESIO(3), OVAR(3), WT(3),
8      * HIS ROUTINE TRANSF AS THE VELOCITY INCREMENTS FROM THE IMU
9      * THAT IS, SPACE STABLE FRAME, IN THE CORP FRAME.
10     C
11     COMMON /IMUCAT/ OESIO(3), OVAR(3), WT(3),
12     * HIS ROUTINE TRANSF AS THE VELOCITY INCREMENTS FROM THE IMU
13     * THAT IS, SPACE STABLE FRAME, IN THE CORP FRAME.
14     C
15     COMMON /IMUCAT/ OESIO(3), OVAR(3), WT(3),
16     * HIS ROUTINE TRANSF AS THE VELOCITY INCREMENTS FROM THE IMU
17     * THAT IS, SPACE STABLE FRAME, IN THE CORP FRAME.
18     C
19     COMMON /IMUCAT/ OESIO(3), OVAR(3), WT(3),
20     * HIS ROUTINE TRANSF AS THE VELOCITY INCREMENTS FROM THE IMU
21     * THAT IS, SPACE STABLE FRAME, IN THE CORP FRAME.
22     C
23     COMMON /IMUCAT/ OESIO(3), OVAR(3), WT(3),
24     * HIS ROUTINE TRANSF AS THE VELOCITY INCREMENTS FROM THE IMU
25     * THAT IS, SPACE STABLE FRAME, IN THE CORP FRAME.
26     C
27     COMMON /IMUCAT/ OESIO(3), OVAR(3), WT(3),
28     * HIS ROUTINE TRANSF AS THE VELOCITY INCREMENTS FROM THE IMU
29     * THAT IS, SPACE STABLE FRAME, IN THE CORP FRAME.
30     C
31     COMMON /IMUCAT/ OESIO(3), OVAR(3), WT(3),
32     * HIS ROUTINE TRANSF AS THE VELOCITY INCREMENTS FROM THE IMU
33     * THAT IS, SPACE STABLE FRAME, IN THE CORP FRAME.
34     C
35     COMMON /IMUCAT/ OESIO(3), OVAR(3), WT(3),
36     * HIS ROUTINE TRANSF AS THE VELOCITY INCREMENTS FROM THE IMU
37     * THAT IS, SPACE STABLE FRAME, IN THE CORP FRAME.
38     C
39     COMMON /IMUCAT/ OESIO(3), OVAR(3), WT(3),
40     * HIS ROUTINE TRANSF AS THE VELOCITY INCREMENTS FROM THE IMU
41     * THAT IS, SPACE STABLE FRAME, IN THE CORP FRAME.
42     C
43     COMMON /IMUCAT/ OESIO(3), OVAR(3), WT(3),
44     * HIS ROUTINE TRANSF AS THE VELOCITY INCREMENTS FROM THE IMU
45     * THAT IS, SPACE STABLE FRAME, IN THE CORP FRAME.
46     C
47     COMMON /IMUCAT/ OESIO(3), OVAR(3), WT(3),
48     * HIS ROUTINE TRANSF AS THE VELOCITY INCREMENTS FROM THE IMU
49     * THAT IS, SPACE STABLE FRAME, IN THE CORP FRAME.
50     C

```



ENTRY POINTS  
1 SSIFRM

VARIABLES		SN	TYPE	RELLOCATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											</
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117 WFT DEAL

12 WT REAL A DAY INITIAL

PAGE 3

FTN 4.5+P405 05/25/76 17.12.47

SUBROUTINE SSLEPH 74/74 OPT=0 TRACE

VARIABLES SN TYPE REAL ARRAY RELOCATION

152 XH REAL NAV

146 XS2PHT REAL NAV

126 XUP92B REAL ARRAY NAV

125 YCALF

124 XSALE

147 YV00P

DEAL

DEAL

REAL

NAV

NAV

NAV

EXTERNALS

MATBAN

VMATVC

VP

TYPE

ARGS

2

3

REAL

1

VCOS

VMY

VCIN

REAL

3

REAL

1

STATEMENT LABELS

0 510

54 520

56 530

LOOPS LABEL INDEX FROM-TO LENGTH PROPERTIES

10 510 \* I 43 45 230

11 510 \* J 44 45 200

EXT DEFS

NOT INNO

EXT DEFS

COMMON BLOCKS LENGTH

THUDAT 67

NAV 182

INPUTS 56

UNV0SL 10

TRAJIN 21

STATISTICS

PROGRAM LENGTH

CM LABELED COMMON LENGTH

1309 84

5200 336



ENTRY POINTS  
1 SSATT

VARIABLES	SN	TYPE	RELOCATION	75	ALPHA	REAL	APPAY	NAV
33 A	REAL	NAV		44	0	REAL	APPAY	NAV
103 APESID	REAL	IMUDAT		155	0099	REAL	APPAY	NAV
77 GALE	REAL	NAV		154	0010	REAL	APPAY	NAV
0 GEPQ2P	REAL	NAV		205	01	REAL	APPAY	IMUDAT
177 G095	REAL	NAV		45	0130	REAL	APPAY	IMUDAT
216 C104	REAL	NAV		20	0005	REAL	APPAY	IMUDAT
56 C1092P	REAL	IMUDAT		207	03	REAL	APPAY	IMUDAT
67 G2095T	REAL	IMUDAT		31	0045	REAL	APPAY	IMUDAT
211 C4	REAL	NAV		153	0014	REAL	APPAY	NAV
22 G09H0	REAL	NAV		123	0014	REAL	APPAY	NAV
100 DELT	REAL	NAV		1	0030	REAL	APPAY	IMUDAT
210 OV592P	REAL	NAV		4	00	REAL	APPAY	IMUDAT
14 OV92P	REAL	NAV		5	00	REAL	APPAY	IMUDAT
F EFPRJ	REAL	UNVPSL		5	00	REAL	APPAY	UNVPSL
101 STA	REAL	NAV		5	00	REAL	APPAY	IMUDAT
112 FILATT	REAL	NAV		225	0045	REAL	APPAY	NAV
71 G020	REAL	NAV		74	00	REAL	APPAY	NAV
1 HPI	REAL	UNVPSL		137	0030	REAL	APPAY	NAV
263 IGATNP	INTEGE2	NAV		105	00	REAL	APPAY	NAV
106 LONG	REAL	NAV		213	00	REAL	APPAY	NAV
214 ONY	REAL	NAV		215	002	REAL	APPAY	NAV
222 OFILTP	REAL	NAV		176	003	REAL	APPAY	NAV
142 OV42P	REAL	NAV		3	00	REAL	APPAY	UNVPSL
216 G2095	REAL	NAV		13	0005	REAL	APPAY	UNVPSL
9 G510	REAL	IMUDAT		11	0030	REAL	APPAY	UNVPSL
17 G40	REAL	NAV		3	00	REAL	APPAY	UNVPSL
2 RG	REAL	UNVPSL		75	0045	REAL	APPAY	NAV
15 3F9TP	REAL	IMUDAT		216	00	REAL	APPAY	NAV
214 S103	REAL	NAV		213	0045	REAL	APPAY	NAV
145 S20HI	REAL	NAV		210	00	REAL	APPAY	NAV
215 S354	REAL	NAV		212	00	REAL	APPAY	NAV
63 THTCOP	REAL	NAV		55	0005	REAL	APPAY	NAV
61 THTVPO	REAL	NAV		42	0030	REAL	APPAY	NAV
104 VD4P	REAL	NAV		107	002	REAL	APPAY	NAV
11 V42P	REAL	NAV		7	0005	REAL	APPAY	NAV
12 HT	REAL	IMUDAT		66	0030	REAL	APPAY	NAV
125 XCALE	REAL	NAV		152	00	REAL	APPAY	NAV
124 XSALF	REAL	NAV		146	0030	REAL	APPAY	NAV
147 XV02P	REAL	NAV		126	0030	REAL	APPAY	NAV

EXTERNALS	TYPE	ARGS
VCOS	REAL	1
VTHM	REAL	3
VSTN	REAL	1

COMMON BLOCKS	LENGTH
IMUDAT	57
NAV	192
UNVPSL	10

STATISTICS	PROGRAM LENGTH	2170	143
		6000	253



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020780 WTE = -VU/PM
020800 MIN = YE/PP + WERE*CLAT9T
021000 C
021010 IPANSEDM IO LLWA FRAME (JEN) AND THEN TO ACTUAL PLATFORM
021020 C
021030 C
021040 C
021050 WTE(2) = WTE*CALF9T + WTM*CALF9T
021060 WTE(3) = -WTE*CALF9T + WTM*CALF9T
021070 IF (IPC(1) .EQ. 0) GO TO 15
021080 CALL DOWILL
021090 15 CALL MATVEC(WT,C9MIS,WT)
021100 C
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021120 C
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021500 C
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SYNTHETIC REFERENCE MAP (R=1)

SAINT ADAMS

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SYMBOLIC REFERENCE MAP (R=1)

SHIRLEY  
SANDY

VARIABLES		SN	TYPE	RELATION		COUNT		PERCENT
				ARRAY	NAV	ALFNT	REAL	
13	A		REAL			3	ALFNT	REAL
75	ALPHA		REAL		NAV	0	ALFNT	REAL
177	ALFNT		REAL	ARRAY	IMUTAT	64	0	REAL
177	ALFNT		REAL		NAV	36	ALFNT	REAL



VARIABLES	SM	TYPE	RELOCATION	INPUTS	12	COUNT	REAL	APRAY	INPUTS
11 CVD2	REAL	REAL	APRAY	INPUTS	12	COUNT	REAL	APRAY	INPUTS
15 CDP93	REAL	REAL	APRAY	INPUTS	177	COUNT	REAL	APRAY	INPUTS
156 CDP10	REAL	REAL	APRAY	INPUTS	55	COUNT	REAL	APRAY	INPUTS
45 CDP97	REAL	REAL	APRAY	INPUTS	57	COUNT	REAL	APRAY	INPUTS
23 CDP95	REAL	REAL	APRAY	INPUTS	22	COUNT	REAL	APRAY	INPUTS
31 CDP15	REAL	REAL	APRAY	INPUTS	111	COUNT	REAL	APRAY	INPUTS
151 NPLM	REAL	REAL	APRAY	INPUTS	15	COUNT	REAL	APRAY	INPUTS
124 DELTA	REAL	REAL	APRAY	INPUTS	210	COUNT	REAL	APRAY	INPUTS
64 OPSMAX	REAL	REAL	APRAY	INPUTS	14	COUNT	REAL	APRAY	INPUTS
1 CVD2	REAL	REAL	APRAY	INPUTS	5	COUNT	REAL	APRAY	INPUTS
4 EF	REAL	REAL	APRAY	INPUTS	101	COUNT	REAL	APRAY	INPUTS
5 CQ	REAL	REAL	APRAY	INPUTS	5	COUNT	REAL	APRAY	INPUTS
112 FILATT	REAL	REAL	APRAY	INPUTS	22	COUNT	REAL	APRAY	INPUTS
71 GDDP	REAL	REAL	APRAY	INPUTS	74	COUNT	REAL	APRAY	INPUTS
4 MD	REAL	REAL	APRAY	INPUTS	1	COUNT	REAL	APRAY	INPUTS
15 WROTCG	REAL	REAL	APRAY	INPUTS	14	COUNT	REAL	APRAY	INPUTS
17 WDDP	REAL	REAL	APRAY	INPUTS	171	COUNT	REAL	APRAY	INPUTS
177 ICHCYL	REAL	REAL	APRAY	INPUTS	261	COUNT	REAL	APRAY	INPUTS
22 ICHPLM	REAL	REAL	APRAY	INPUTS	23	COUNT	REAL	APRAY	INPUTS
21 ICHVVP	REAL	REAL	APRAY	INPUTS	51	COUNT	REAL	APRAY	INPUTS
5 IML	REAL	REAL	APRAY	INPUTS	67	COUNT	REAL	APRAY	INPUTS
21 IPC	REAL	REAL	APRAY	INPUTS	135	COUNT	REAL	APRAY	INPUTS
17 ITATT	REAL	REAL	APRAY	INPUTS	125	COUNT	REAL	APRAY	INPUTS
16 ITPHAV	REAL	REAL	APRAY	INPUTS	2	COUNT	REAL	APRAY	INPUTS
1 LAT9T	REAL	REAL	APRAY	INPUTS	214	COUNT	REAL	APRAY	INPUTS
20 LONGS	REAL	REAL	APRAY	INPUTS	222	COUNT	REAL	APRAY	INPUTS
212 ONX	REAL	REAL	APRAY	INPUTS	3	COUNT	REAL	APRAY	INPUTS
216 ON7	REAL	REAL	APRAY	INPUTS	3	COUNT	REAL	APRAY	INPUTS
176 ON9	REAL	REAL	APRAY	INPUTS	3	COUNT	REAL	APRAY	INPUTS
142 ON22P	REAL	REAL	APRAY	INPUTS	2	COUNT	REAL	APRAY	INPUTS
5 PLOTIM	REAL	REAL	APRAY	INPUTS	1	COUNT	REAL	APRAY	INPUTS
6 PONT	REAL	REAL	APRAY	INPUTS	11	COUNT	REAL	APRAY	INPUTS
216 ON295	REAL	REAL	APRAY	INPUTS	11	COUNT	REAL	APRAY	INPUTS
7 OFC10	REAL	REAL	APRAY	INPUTS	155	COUNT	REAL	APRAY	INPUTS
17 ONO	REAL	REAL	APRAY	INPUTS	3	COUNT	REAL	APRAY	INPUTS
166 PP	REAL	REAL	APRAY	INPUTS	2	COUNT	REAL	APRAY	INPUTS
65 R5MAX	REAL	REAL	APRAY	INPUTS	2	COUNT	REAL	APRAY	INPUTS
7 R5TRV	REAL	REAL	APRAY	INPUTS	24	COUNT	REAL	APRAY	INPUTS
76 SELF	REAL	REAL	APRAY	INPUTS	15	COUNT	REAL	APRAY	INPUTS
13 SFOT	REAL	REAL	APRAY	INPUTS	52	COUNT	REAL	APRAY	INPUTS
21 SLAT9T	REAL	REAL	APRAY	INPUTS	64	COUNT	REAL	APRAY	INPUTS
63 SYVO	REAL	REAL	APRAY	INPUTS	4	COUNT	REAL	APRAY	INPUTS
3 STORT	REAL	REAL	APRAY	INPUTS	53	COUNT	REAL	APRAY	INPUTS
145 S2PHI	REAL	REAL	APRAY	INPUTS	50	COUNT	REAL	APRAY	INPUTS
55 INTERI	REAL	REAL	APRAY	INPUTS	17	COUNT	REAL	APRAY	INPUTS
0 TIME	REAL	REAL	APRAY	INPUTS	162	COUNT	REAL	APRAY	INPUTS
44 TMP	REAL	REAL	APRAY	INPUTS	11	COUNT	REAL	APRAY	INPUTS
164 TPO2	REAL	REAL	APRAY	INPUTS	124	COUNT	REAL	APRAY	INPUTS
4 TPOF9	REAL	REAL	APRAY	INPUTS	151	COUNT	REAL	APRAY	INPUTS
42 TPO SIO	REAL	REAL	APRAY	INPUTS	17	COUNT	REAL	APRAY	INPUTS
161 VT	REAL	REAL	APRAY	INPUTS	11	COUNT	REAL	APRAY	INPUTS
2 VONANT	REAL	REAL	APRAY	INPUTS	12	COUNT	REAL	APRAY	INPUTS
127 VPO2	REAL	REAL	APRAY	INPUTS	12	COUNT	REAL	APRAY	INPUTS
7 VPT	REAL	REAL	APRAY	INPUTS	12	COUNT	REAL	APRAY	INPUTS

VARIABLES	SN	TYPE	RELOCATION
152 XH	REAL	124 X5ALF	REAL
146 X52PH1	REAL	147 XW32P	REAL
126 XDP92P	REAL	ARRAY	NAV

EXTERNALS	TYPE	APCS	MATVEC
OUT	1		3
4M	3		2
SOPT	REAL	1 LIBRARY	

STATISTICS LABELS	INACTIVE	50	15
0 10		112	20
0 10			
121 50			

LOOPS LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
51 17	I	72 74	58	INSTACK
64 19	I	76 77	58	INSTACK
113 30	I	86 87	48	INSTACK

COMMON BLOCKS	LENGTH
CONTROL	9
INPUT	67
INPUTS	56
NAV	182
UNWRS	10
IPAJIN	21

STATISTICS	PROGRAM LENGTH	1713	121
CP LABELLED COMMON LENGTH	5313	345	



END

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS

1 LLAUUD

VARIABLES	SN	TYPE	RELOCATION	ARRAY	NAV	3	ALF31	REAL	TRAJIN
75 ALPHA	REAL	REAL	NAV	NAV	NAV	9	ALF31	REAL	TRAJIN
100 AFSIO	REAL	REAL	NAV	NAV	NAV	44	R	REAL	NAV
77 CALF	REAL	REAL	NAV	NAV	NAV	24	CALF31	REAL	TRAJIN
22 CLAT91	REAL	REAL	TRAJIN	NAV	NAV	10	CALF31	REAL	TRAJIN
11 CVD2	REAL	REAL	INPUTS	NAV	NAV	12	CVD3	REAL	NAV
155 CDP90	REAL	REAL	NAV	NAV	NAV	9	CDP92P	REAL	NAV
154 CDP10	REAL	REAL	NAV	NAV	NAV	177	C995	REAL	NAV
45 CDP90	REAL	REAL	NAV	NAV	NAV	56	C1092P	REAL	NAV
20 CDP95	REAL	REAL	NAV	NAV	NAV	57	C2092P	REAL	NAV
31 CDP95	REAL	REAL	NAV	NAV	NAV	22	C2092P	REAL	NAV
153 CDP95	REAL	REAL	NAV	NAV	NAV	107	CFL1	REAL	NAV
123 CDP95	REAL	REAL	NAV	NAV	NAV	16	CFL1	REAL	NAV
65 CDP95	REAL	REAL	NAV	NAV	NAV	210	CFL1	REAL	NAV
3 CDP95	REAL	REAL	NAV	NAV	NAV	14	CFL1	REAL	NAV
101 STA	REAL	REAL	NAV	NAV	NAV	112	CFL1	REAL	NAV
225 GAINS	REAL	REAL	NAV	NAV	NAV	71	CFL1	REAL	NAV
74 H	REAL	REAL	NAV	NAV	NAV	4	H3	REAL	NAV
15 HSNINC	REAL	REAL	NAV	NAV	NAV	14	HSNINC	REAL	NAV
137 HV92P	REAL	REAL	NAV	NAV	NAV	7	TCNCL	REAL	NAV
10 IC4XP	INTEGER	INTEGER	NAV	NAV	NAV	22	IC4XP	INTEGER	NAV
23 IC4XP	INTEGER	INTEGER	NAV	NAV	NAV	21	IC4XP	INTEGER	NAV
61 IC4XP	INTEGER	INTEGER	NAV	NAV	NAV	5	IC4XP	INTEGER	NAV
6 IC4XP	INTEGER	INTEGER	NAV	NAV	NAV	17	IC4XP	INTEGER	NAV
67 IC4XP	INTEGER	INTEGER	NAV	NAV	NAV	16	IC4XP	INTEGER	NAV
105 LAT	REAL	REAL	NAV	NAV	NAV	4	LAT91	REAL	NAV
106 LONG	REAL	REAL	NAV	NAV	NAV	20	LONG91	REAL	NAV
2 LONG91	REAL	REAL	NAV	NAV	NAV	213	LONG91	REAL	NAV
214 ONV	REAL	REAL	NAV	NAV	NAV	215	ONV	REAL	NAV
222 OFILTR	REAL	REAL	NAV	NAV	NAV	176	ONV	REAL	NAV
0 OTIME	REAL	REAL	NAV	NAV	NAV	142	OTIME	REAL	NAV
5 PLOTIM	REAL	REAL	NAV	NAV	NAV	2	PLOTIM	REAL	NAV
5 PPHIT	REAL	REAL	NAV	NAV	NAV	1	PPHIT	REAL	NAV
216 Q2P95	REAL	REAL	NAV	NAV	NAV	10	Q2P95	REAL	NAV
17 PHO	REAL	REAL	NAV	NAV	NAV	15	PHO	REAL	NAV
3 QSTIME	REAL	REAL	NAV	NAV	NAV	7	QSTIME	REAL	NAV
76 SALE	REAL	REAL	NAV	NAV	NAV	23	SALE91	REAL	NAV
13 S191	REAL	REAL	NAV	NAV	NAV	15	S191	REAL	NAV
21 SLAT91	REAL	REAL	NAV	NAV	NAV	62	SLAT91	REAL	NAV
63 S191	REAL	REAL	NAV	NAV	NAV	64	S191	REAL	NAV
3 START	REAL	REAL	NAV	NAV	NAV	4	START	REAL	NAV
105 S191	REAL	REAL	NAV	NAV	NAV	174	S191	REAL	NAV

VARIABLES	SM	TYPE	RELOCATION
20 FHTTQ	REAL	ARRAY	NAV
17 TIMEQ	REAL	TPAJIN	NAV
4 TPFV	REAL	CONTROL	NAV
42 TPCSD	REAL	ARRAY	NAV
2 VOUANT	REAL	INPUTS	NAV
107 V92	REAL	ARRAY	NAV
12 WT	REAL	ARRAY	NAV
126 XCALF	REAL	NAV	NAV
124 YSALF	REAL	NAV	NAV
147 XV92P	REAL	ARRAY	NAV

EXTENSIONALS	TYPE	ARGS.
ATAM2	REAL	2 LIBRARY
DOUT	REAL	1
QNT17	REAL	2
SIN	REAL	1 LIBRARY

STATEMENT LABELS	TYPE	LIBRARY
55	REAL	1 LIBRARY
20	REAL	1 LIBRARY
50	REAL	1 LIBRARY
51	REAL	1 LIBRARY
52	REAL	1 LIBRARY
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54	REAL	1 LIBRARY
55	REAL	1 LIBRARY
56	REAL	1 LIBRARY
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97	REAL	1 LIBRARY
98	REAL	1 LIBRARY
99	REAL	1 LIBRARY

COMMON BLOCKS	LENGTH
CONTROL	3
IMUDAY	67
INPUTS	55
NAV	142
TPAJIN	21

STATISTICS	PROGRAM LENGTH	1359	93
COMMON LENGTH	5170	315	

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1      SUBROUTINE LLATT
      C
      C
      C      THIS ROUTINE CONSTRUCTS THE ONLY TO LVN TRANSFORMATION
      C      MATRIX FOR USE IN DETERMINING THE ATTITUDE ANGLES. THE
      C      MATRIX IS FORMED FROM THE 4 GYRAL ANGLES CALCULATED IN
      C      ROUTINE "LLAT00".
      C
      C
      C      H -- OUTER ROLL
      C      X -- PITCH
      C      Y -- INNER ROLL
      C      Z -- YAW
      C
      C      IMPLICIT REAL(A-H,L-Z)
      C      COMMON /INPUTS/ AQUANT, PL01IP,
      C      1 STOP,
      C      2 CVD2,
      C      3 IPC(70),
      C      4 RSMAX,
      C      5 RSPHT,
      C      6 C0910(3,3),
      C      7 C0920(3,3),
      C      8 C0930(3,3),
      C      9 GAIN(3,3),
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      C      99 GAIN(3,3),
      C      100 GAIN(3,3)

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SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
1 LLATT

VARIABLES	SN	TYPE	RELATION	ARRAY	NAV	INDUITS	75	ALPHA	REAL	NAV	INPUT
11 A	1	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
12 A	2	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
13 A	3	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
14 A	4	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
15 A	5	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
16 A	6	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
17 A	7	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
18 A	8	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
19 A	9	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
20 A	10	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
21 A	11	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
22 A	12	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
23 A	13	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
24 A	14	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
25 A	15	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
26 A	16	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
27 A	17	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
28 A	18	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
29 A	19	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
30 A	20	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
31 A	21	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
32 A	22	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
33 A	23	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
34 A	24	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
35 A	25	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
36 A	26	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
37 A	27	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
38 A	28	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
39 A	29	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
40 A	30	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
41 A	31	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
42 A	32	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
43 A	33	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
44 A	34	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
45 A	35	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
46 A	36	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
47 A	37	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
48 A	38	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
49 A	39	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
50 A	40	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
51 A	41	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
52 A	42	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
53 A	43	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
54 A	44	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
55 A	45	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
56 A	46	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
57 A	47	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
58 A	48	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
59 A	49	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
60 A	50	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
61 A	51	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
62 A	52	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
63 A	53	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
64 A	54	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
65 A	55	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
66 A	56	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
67 A	57	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
68 A	58	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
69 A	59	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
70 A	60	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
71 A	61	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
72 A	62	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
73 A	63	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
74 A	64	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
75 A	65	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
76 A	66	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
77 A	67	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
78 A	68	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
79 A	69	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
80 A	70	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
81 A	71	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
82 A	72	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
83 A	73	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
84 A	74	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
85 A	75	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
86 A	76	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
87 A	77	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
88 A	78	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
89 A	79	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
90 A	80	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
91 A	81	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
92 A	82	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
93 A	83	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
94 A	84	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
95 A	85	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
96 A	86	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
97 A	87	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
98 A	88	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
99 A	89	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT
100 A	90	REAL	REAL	ARRAY	NAV	INDUITS	190	ALPHA	REAL	NAV	INPUT

VARIABLES	SN	TYPE	RELOCATION	20	C0905	REAL	ARRAY	INPUT
56 C102P	REAL	ARRAY	INPUT	20	C0905	REAL	ARRAY	INPUT
67 C2P051	REAL	ARRAY	INPUT	31	C0905	REAL	ARRAY	INPUT
22 C4P00	REAL	ARRAY	INPUT	153	C0905	REAL	ARRAY	INPUT
100 DELT	REAL	ARRAY	INPUT	123	C0905	REAL	ARRAY	INPUT
66 C1SMAX	REAL	ARRAY	INPUT	210	C0905	REAL	ARRAY	INPUT
3 DV4P	REAL	ARRAY	INPUT	14	C0905	REAL	ARRAY	INPUT
101 FTA	REAL	ARRAY	INPUT	6	C0905	REAL	ARRAY	INPUT
112 FILAT	REAL	ARRAY	INPUT	225	C0905	REAL	ARRAY	INPUT
71 C92P	REAL	ARRAY	INPUT	74	C0905	REAL	ARRAY	INPUT
15 H50INC	REAL	ARRAY	INPUT	14	C0905	REAL	ARRAY	INPUT
17 HV4P	REAL	ARRAY	INPUT	22	C0905	REAL	ARRAY	INPUT
263 IGAINP	INTEGER	ARRAY	INPUT	21	C0905	INTEGER	ARRAY	INPUT
20 INCH	INTEGER	ARRAY	INPUT	61	C0905	INTEGER	ARRAY	INPUT
23 INC	INTEGER	ARRAY	INPUT	17	C0905	INTEGER	ARRAY	INPUT
67 IPFIL	INTEGER	ARRAY	INPUT	16	C0905	INTEGER	ARRAY	INPUT
155 LAF	REAL	ARRAY	INPUT	106	C0905	REAL	ARRAY	INPUT
213 ONX	REAL	ARRAY	INPUT	214	C0905	REAL	ARRAY	INPUT
215 ONZ	REAL	ARRAY	INPUT	223	C0905	REAL	ARRAY	INPUT
176 ONB	REAL	ARRAY	INPUT	142	C0905	REAL	ARRAY	INPUT
5 PLOTIN	REAL	ARRAY	INPUT	6	C0905	REAL	ARRAY	INPUT
216 C2P95	REAL	ARRAY	INPUT	0	C0905	REAL	ARRAY	INPUT
17 OND	REAL	ARRAY	INPUT	65	C0905	REAL	ARRAY	INPUT
7 CSTRY	REAL	ARRAY	INPUT	76	C0905	REAL	ARRAY	INPUT
15 SP4TP	REAL	ARRAY	INPUT	62	C0905	REAL	ARRAY	INPUT
61 SSY0	REAL	ARRAY	INPUT	64	C0905	REAL	ARRAY	INPUT
3 STAPT	REAL	ARRAY	INPUT	4	C0905	REAL	ARRAY	INPUT
145 SPPI	REAL	ARRAY	INPUT	61	C0905	REAL	ARRAY	INPUT
55 INTERT	REAL	ARRAY	INPUT	63	C0905	REAL	ARRAY	INPUT
17 TOLJPK	REAL	ARRAY	INPUT	1	C0905	REAL	ARRAY	INPUT
42 PRESID	REAL	ARRAY	INPUT	104	C0905	REAL	ARRAY	INPUT
2 VQUANT	REAL	ARRAY	INPUT	107	C0905	REAL	ARRAY	INPUT
11 V42P	REAL	ARRAY	INPUT	6	C0905	REAL	ARRAY	INPUT
12 WF	REAL	ARRAY	INPUT	66	C0905	REAL	ARRAY	INPUT
7 X	REAL	ARRAY	INPUT	125	C0905	REAL	ARRAY	INPUT
152 XH	REAL	ARRAY	INPUT	124	C0905	REAL	ARRAY	INPUT
146 X2PHI	REAL	ARRAY	INPUT	147	C0905	REAL	ARRAY	INPUT
126 XOP2P	REAL	ARRAY	INPUT	10	C0905	REAL	ARRAY	INPUT
11 Z	REAL	ARRAY	INPUT		C0905	REAL	ARRAY	INPUT

1-101

EXTERNALS	TYPE	ARGS
VC05	REAL	1
VOTXYZ	REAL	7

COMMON BLOCKS	LENGTH
INPUTS	56
INPUTS	57
INPUTS	192

STATISTICS	PROGRAM LENGTH	COMMON LENGTH
	1068	70
	4638	305







UNIVPSL

REAL

1 11111

INPUTS

REAL

1 11111

PAGE

05/25/76 17.12.47

FIN 4.519405

74774 001=0.1846

SUBROUTINE LLINK

VARIABLES	SN	TYPE	RELOCATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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1      SUBROUTINE SOA100
2      C
3      C THIS SUBROUTINE CALCULATES THE INCREMENTAL GIMBAL ANGLES
4      C THAT WOULD BE GENERATED BY A PERFECT STRADDLE INH.
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ETAGP(I)=ETAGP(I)+APESJ(I)  
Z776..APESID(I)=ETAGP(I)  
CALL DMU17(ETAGP,AQUANT)

777 ARESIO(1)=ARESIO(1)-FIAOP(1)  
IF (IPC(2).NE.0) CALL DOUT(2)  
RETURN.  
END

## SYMBOLIC REFERENCE MAP (P=1)

ENTRY POINTS	STATUS
1	1

VARIABLES	SN	TYPE	RELOCATION	3	ALFQ1	REAL	TOAJTN
33 A	REAL	NAV	APRAY	3	ALFQ1	REAL	TOAJTN
75 ALPHA	REAL	NAV	NAV	0	ALFQ1	REAL	NAV
109 APES10	REAL	NAV	NAV	44	B	REAL	NAV
77 CALF	REAL	NAV	NAV	24	CALFQ1	REAL	TOAJTN
22 CLAT9T	REAL	NAV	NAV	10	CV01	REAL	INPUTS
11 CV02	REAL	NAV	NAV	12	CV03	REAL	INPUTS
165 G0P90	REAL	NAV	NAV	0	C10000	REAL	NAV
154 G0910	REAL	NAV	NAV	177	C095	REAL	NAV
45 G1090	REAL	NAV	NAV	56	C1002P	REAL	NAV
20 G2P95	REAL	NAV	NAV	57	C0905T	REAL	NAV
31 G0M15	REAL	NAV	NAV	22	C0900	REAL	NAV
153 G1M1	REAL	NAV	NAV	109	NELT	REAL	NAV
123 N1LTA	REAL	NAV	NAV	15	NELT5	REAL	NAV
66 UPSMAX	REAL	NAV	NAV	213	NU902P	REAL	NAV
3 JV9P	REAL	NAV	NAV	14	NU902P	REAL	NAV
4 FF	REAL	NAV	NAV	5	FFQ00	REAL	NAV
5 ESQ	REAL	NAV	NAV	171	ETA	REAL	NAV
6 ETA9P	REAL	NAV	NAV	5	ETA9T	REAL	NAV
112 FILATT	REAL	NAV	NAV	225	GATHS	REAL	NAV
71 G92P	REAL	NAV	NAV	74	H	REAL	NAV
4 RB	REAL	NAV	NAV	1	HPI	REAL	NAV
15 HS010C	REAL	NAV	NAV	16	HS010T	REAL	NAV
137 HV92P	REAL	NAV	NAV	157	I	REAL	NAV
22 IFPLTH	INTEGER	NAV	NAV	263	ICATNP	INTEGER	NAV
21 IMUTYP	INTEGER	NAV	NAV	21	THCOF	INTEGER	NAV
61 IOPNLP	INTEGER	NAV	NAV	21	JTC	INTEGER	NAV
17 ITRATT	INTEGER	NAV	NAV	57	JTCFJL	INTEGER	NAV
16 ITPNAV	INTEGER	NAV	NAV	150	J	INTEGER	NAV
105 LAT	REAL	NAV	NAV	1	LAT9T	REAL	NAV
196 LONG	REAL	NAV	NAV	20	LONG0	REAL	NAV
2 LONG9T	REAL	NAV	NAV	213	NAV	REAL	NAV
214 OOV	REAL	NAV	NAV	215	NAV	REAL	NAV
222 OFLTP	REAL	NAV	NAV	175	NAV	REAL	NAV
142 OV002P	REAL	NAV	NAV	3	PT	REAL	NAV
5 P00114	REAL	NAV	NAV	6	P00114	REAL	NAV
215 P0095	REAL	NAV	NAV	10	P0095	REAL	NAV
0 P0070	REAL	NAV	NAV	11	P0070	REAL	NAV

VARIABLES	SN	TYPE	RELOCATION	INPUTS	7	PSIPI	REAL	INPUTS
65 OSHAX	REAL		INPUTS				REAL	NAV
2 R6	REAL		UNVPSL		75	SELF	REAL	
21 SALFYT	REAL		TPAJIN		143	CF	REAL	
13 SFOT	REAL	ARRAY	TPAJIN		15	SFOTIP	REAL	ARRAY
21 GLATOT	REAL		TPAJIN		42	SSXN	REAL	INPUTS
61 SSYO	REAL		INPUTS		64	SSZD	REAL	INPUTS
7 STAP	REAL		INPUTS		141	CTH	REAL	
4 STOP	REAL		INPUTS		145	STPHI	REAL	NAV
162 TH	REAL				63	THTRAP	REAL	NAV
55 THICST	REAL	ARRAY	NAV		61	TUTTOO	REAL	NAV
0 TIME	REAL		TPAJIN		17	TIMEP	REAL	NAV
164 THP	REAL	ARRAY			13	TOLJCK	REAL	INPUTS
104 VDMF	REAL		INPUTS		42	TORSTO	REAL	INPUTS
10 V4T	REAL	ARRAY	TPAJIN		117	WQD	REAL	NAV
11 V92P	REAL	ARRAY	NAV		2	WQJANI	REAL	NAV
12 WT	REAL	ARRAY	TPAJIN		1	WQJ	REAL	UNVPSL
126 XCALF	REAL		TPAJIN		66	WYU	REAL	NAV
124 XSALF	REAL		NAV		152	XH	REAL	NAV
147 XV92P	REAL	ARRAY	NAV		146	XSTPHI	REAL	NAV
	REAL	ARRAY	NAV		176	VOP92P	REAL	NAV

EXTERNALS	TYPE	NOGS	REAL	1	LIBRARY
ASIN	REAL		REAL	1	LIBRARY
ACUY				3	
MTM				2	
GOZYX				1	LIBRARY
GOZY	REAL		REAL	1	LIBRARY

STATEMENT LABELS	0	15	0	776	0	777
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LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	NOT INVEP
25	15	*	42	44	118	
26	15		43	44	63	INSTACK
72	776		57	59	60	INSTACK
103	777		61	62	48	INSTACK

COMMON BLOCKS	LENGTH
NAV	182
INPUTS	56
TPAJIN	67
UNVPSL	21
	10

STATISTICS			
PROGRAM LENGTH	1673	119	
COMMON LENGTH	5200	376	



SUBROUTINE SGNIG ZAZZA COLLOC TRACE

FTN 4.5+24.06

VARIABLES	SN	TYPE	RELOCATION	REAL	ARRAY	NAV	TRAJTH
6 F149P	REAL	IMUNAT	5	F149T	REAL	ARRAY	TRAJTH
112 FILATY	REAL	ARRAY	225	GAINS	REAL	ARRAY	NAV
71 G02P	REAL	NAV	74	H	REAL	ARRAY	NAV
4 H0	REAL	TRAJIN	137	MY22P	REAL	ARRAY	NAV
263 ICAINP	INTEGER	NAV	135	LAT	REAL	NAV	NAV
1 LAT9T	REAL	TRAJIN	105	LONG	REAL	NAV	NAV
20 LONGO	REAL	TRAJIN	2	LONGOT	REAL	NAV	NAV
213 GDX	REAL	NAV	214	OTY	REAL	NAV	NAV
215 ONZ	REAL	NAV	222	OFFLIR	REAL	NAV	NAV
176 ON3	REAL	NAV	142	OV320	REAL	NAV	NAV
215 02P45	REAL	NAV	3	0FSIN	REAL	NAV	NAV
17 2HO	REAL	NAV	76	SAFE	REAL	NAV	NAV
23 SALF9T	REAL	TRAJIN	13	SFAT	REAL	NAV	NAV
15 SF9TP	REAL	IMUNAT	21	SLAT9T	REAL	NAV	NAV
145 12PHI	REAL	NAV	63	INTG0P	REAL	NAV	NAV
55 THIERI	REAL	NAV	50	THIT90	REAL	NAV	NAV
0 TIME	REAL	TRAJIN	17	TT403	REAL	NAV	NAV
101 TMP	REAL	NAV	42	T0FS10	REAL	NAV	NAV
104 V0HP	REAL	NAV	19	VAT	REAL	NAV	NAV
137 V92	REAL	NAV	11	V320	REAL	NAV	NAV
12 WT	REAL	IMUNAT	66	MXV	REAL	NAV	NAV
125 XSCALE	REAL	NAV	152	XH	REAL	NAV	NAV
124 XSALF	REAL	NAV	146	XS0PHI	REAL	NAV	NAV
147 XV92P	REAL	NAV	125	X0002P	REAL	NAV	NAV

EXTERNALS	TYPE	ARGS	MAIPAH	P01Y2
C05	REAL	1	LIBRARY	?
MATVEC	REAL	1	LIBRARY	?
SIN	REAL	1	LIBRARY	?

COMMON BLOCKS	LENGTH
NAV	102
IMUNAT	67
TRAJIN	21

STATISTICS	PROGRAM LENGTH	1040	58
CM LABELD COMMON LENGTH	4168	270	

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2      C THIS ROUTINE PERFORMS THE INITIALIZATION OF THE STORAGCN
3      C CASE. THE NAX EQUATIONS ARE INITIALIZED WITH THE COMMON
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C IF ATTITUDE FILTER REQUEST, INIT STATE VECTOR

FILEAT(1,1)=VP(ETAT(1))

FILEAT(1,2)=VP(ETAT(2))

FILEAT(1,3)=VP(ETAT(3))

END

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SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
1 SPOINT

VARIABLES	SN	TYPE	RELOCATION	3	ALF9T	REAL	TRAJIN
33. A	REAL	ARRAY	NAV	3	ADJANT	REAL	THRUPT
75 ALPHA	REAL	NAV	NAV	3		REAL	NAV
107 APESID	REAL	ARRAY	IMUDAT	44	9	REAL	TRAJIN
77 CALF	REAL	NAV	NAV	24	CALF9T	REAL	THRUPT
22 CLAT9T	REAL	TRAJIN	TRAJIN	13	CW9T	REAL	THRUPT
11 CVD9	REAL	IMPUTS	IMPUTS	12	CW9T	REAL	NAV
165 CDP90	REAL	ARRAY	NAV	0	CDP92P	REAL	NAV
154 CDP910	REAL	ARRAY	NAV	177	CD95	REAL	NAV
45 CDP99	REAL	ARRAY	IMUDAT	56	CD992P	REAL	IMUDAT
20 CDP95	REAL	ARRAY	IMUDAT	67	CD995T	REAL	IMUDAT
71 CDP95	REAL	ARRAY	IMUDAT	22	CD995T	REAL	NAV
151 DELTA	REAL	NAV	NAV	100	DELTA	REAL	NAV
121 DELTA	REAL	NAV	NAV	15	DELTA	REAL	TRAJIN
64 DPMAX	REAL	IMPUTS	IMPUTS	219	DM92P	REAL	NAV
7 DM99P	REAL	NAV	NAV	14	DM92P	REAL	NAV
171 ETA	REAL	ARRAY	NAV	5	ETA9P	REAL	IMUDAT
5 ETAGT	REAL	ARRAY	TRAJIN	112	ETAGT	REAL	NAV
225 GAINS	REAL	NAV	NAV	71	G92P	REAL	NAV
74 H	REAL	NAV	NAV	4	H9	REAL	TRAJIN
15 HSDING	REAL	IMPUTS	IMPUTS	14	HSD9T9	REAL	THRUPT
137 HV92P	REAL	NAV	NAV	244	I	INTEG9	NAV
7 IC9CVL	INTEG9	CONTROL	CONTROL	10	IC9CYP	INTEG9	CONTROL
22 IERLIN	INTEG9	IMPUTS	IMPUTS	253	IGALNP	INTEG9	NAV
21 IMUTYP	INTEG9	IMPUTS	IMPUTS	20	INC9P	INTEG9	IMPUTS
5 INTY	INTEG9	CONTROL	CONTROL	51	IO9HLP	INTEG9	CONTROL
21 IPC	INTEG9	IMPUTS	IMPUTS	5	ISTOP	INTEG9	IMPUTS
17 ITPAT	INTEG9	IMPUTS	IMPUTS	57	IT9FIL	INTEG9	IMPUTS
14 IT9NAV	INTEG9	IMPUTS	IMPUTS	245	J	INTEG9	IMPUTS
105 LAT	REAL	NAV	NAV	1	LAT9T	REAL	TRAJIN
106 LONG	REAL	NAV	NAV	20	LONG9	REAL	TRAJIN
214 LONG9T	REAL	TRAJIN	TRAJIN	213	ONX	REAL	NAV
214 ONV	REAL	NAV	NAV	215	ONZ	REAL	NAV
220 OFILTR	REAL	ARRAY	NAV	176	ONZ	REAL	NAV
9 OTIME	REAL	CONTROL	CONTROL	102	OV970	REAL	NAV
5 PLATIM	REAL	IMPUTS	IMPUTS	2	PLTIME	REAL	NAV
6 PENT	REAL	IMPUTS	IMPUTS	1	PLTIME	REAL	NAV
216 TDP95	REAL	ARRAY	NAV	3	P95T9	REAL	IMUDAT
17 TDP9	REAL	ARRAY	NAV	56	T9NAV	REAL	THRUPT
2 TDP9	REAL	CONTROL	CONTROL	7	T9NAV	REAL	THRUPT

FIN 4.5+240E. 55/25/76 17.10.47

SUBROUTINE SDINI 74/74 OPI=0 TRACE

VARIABLES	SN	TYPE	RELOCATION
11 S99T	REAL	ARRAY	TPAJIN
21 SLAT9T	REAL	ARRAY	TPAJIN
61 SSV8	REAL	ARRAY	TPAJIN
3 STAPI	REAL	ARRAY	TPAJIN
145 S9PHI	REAL	ARRAY	TPAJIN
55 T9TERT	REAL	ARRAY	TPAJIN
0 TIME	REAL	ARRAY	TPAJIN
13 TOLJIK	REAL	ARRAY	TPAJIN
1 TOUANT	REAL	ARRAY	TPAJIN
104 V9MC	REAL	ARRAY	TPAJIN
10 V9T	REAL	ARRAY	TPAJIN
11 V92P	REAL	ARRAY	TPAJIN
66 X9V	REAL	ARRAY	TPAJIN
122 X9	REAL	ARRAY	TPAJIN
146 X92PHI	REAL	ARRAY	TPAJIN
126 X92P2P	REAL	ARRAY	TPAJIN

FILE NAMES MODE  
TAPE6 FMT

EXTERNALS	TYPE	ARGS	COS	REAL	1 LIBRARY
11 S99T	REAL	0	TPAJIN	0	0
21 SLAT9T	REAL	3	TPAJIN	7	0
61 SSV8	REAL	7	TPAJIN	0	0
3 STAPI	REAL	1 LIBRARY	TPAJIN	0	1
145 S9PHI	REAL	1	TPAJIN	0	0
55 T9TERT	REAL	1	TPAJIN	0	0

STATEMENT LABELS

71 3	FMT	0 4	0 5
231 6	FMT	144 8AA	

LOOPS	LAFL	INDEX	FROM-TO	LENGTH	PROPERTIES
74 4	* I	46 49	203		EXT REFS NOT INHER
75 4	* J	47 49	210		EXT REFS
122 5	* I	51 52	68		EXT REFS

COMMON BLOCKS	LENGTH
CONTROL	9
INPUTS	57
NAV	56
TPAJIN	182
	21

STATISTICS	PROGRAM LENGTH	2460	156
CM LABELD COMMON LENGTH	5178	315	





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115      15 C2P95(I,J)=R(I,J)
          IF (IPC(I2) .NE. 0) CALL GOUT(I2)
          C      UPDATE ONLY TO COMP FRAME TO AVOID FROM WITH INCREMENTAL ROTATION
          IF ((I2E..LI..HSJINC)..GO..IO..20
              *SOTIME=VOTIME+HSJINC)
              CALL ORTHO(C2P95)
              20 CALL VMATVC(IMP,4,BV9P)
                  30 GO I=1,3
                  60 QV532P(I)=VP(INV532P(I)+V4P(I))
          C      QV532P..HOLD..SUMMATION..UNTIL..TIME..WHEN..INVRAY..WILL..BE..CALLED...
          IF (IPC(I7) .NE. 0) CALL GOUT(I7)
          IF (IPC(I9) .NE. 0) CALL GOUT(I9)
          RETURN
          END
125

```

CARD NO. SPEEDY DETAILS DIAGNOSIS OF PROBABILITY

F3 I CONSTANT AND LONG. HIGH COVER NIGHTS OBTAINED, BUT SOME PRECISION LOSS.

## SYMBOLIC REFERENCE MAP (2=1)

ENTROY POINTS  
1 HSTWIG

[illegible]

VARIABLES	SN	TYPE	RELOCATION	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
5 INI	51	INTEGER	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
23 IOP	6	INTEGER	INPUTS	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
17 ITCAT	67	INTEGER	INPUTS	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
15 IYMAV	274	INTEGER	INPUTS	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
125 LAR	1	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
105 LONG	20	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
2 LONGST	213	REAL	TRAJIN	TRAJIN	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
214 OOV	215	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
222 OFILIP	176	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
0 OTIME	142	REAL	CONTROL	CONTROL	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
5 PLOVIN	2	REAL	INPUTS	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
6 PPNF	1	REAL	INPUTS	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
745 P0	754	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
755 P2	755	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
214 Q0	757	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
766 Q01	757	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
770 Q02	217	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
763 Q1N	763	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
771 Q12	223	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
761 Q2H	216	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
764 Q2S	773	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
221 Q3	765	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
773 Q31	0	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
17 RHO	65	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
7 PSYME	7	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
76 SELF	23	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
13 SF9T	15	REAL	TRAJIN	TRAJIN	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
21 CLATST	62	REAL	TRAJIN	TRAJIN	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
63 SCVP	64	REAL	INPUTS	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
3 START	4	REAL	INPUTS	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
145 SCPHI	63	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
55 TINTST	63	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
0 TIRE	17	REAL	TRAJIN	TRAJIN	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
775 TMP	13	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
4 TOPY	1	REAL	CONTROL	CONTROL	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
52 TOSTIO	747	REAL	TRAJIN	TRAJIN	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
104 VOMP	2	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
13 VOT	107	REAL	TRAJIN	TRAJIN	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
11 VQ2P	12	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
56 XAV	125	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
750 X01X	751	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
752 X012	152	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
126 X0ALF	146	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL
147 XQ2P	126	REAL	NAV	NAV	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL	INPUTS	ARRAY	CONTROL

EXTRONALS	TYPE	ARGS
DOCHUDN	3	0000
MAIPAH	2	0000
VMATVC	3	0000
VP	1	0000

STATEMENT LABELS

0	15
1	35
2	400
3	417
4	466

611	20
153	830
551	900

05/25/75 17.17.47

FIN 4.5+0006

SUBROUTINE HSING				TRACE	
LOCUS	CASEL	INDEX	FROM-TO	LENGTH	PROPERTIES
10	* I		39 40	17B	EXT REFS
552	15	* I	110 115	250	EXT REFS
553	15	* J	113 115	210	EXT REFS
514	50	* I	122 123	70	EXT REFS

COMMON BLOCKS		LENGTH
CONTROL		9
IMUNIT		57
INPUTS		56
RAW		182
TOAJIN		21

STATISTICS			
PROGRAM LENGTH	10803	512	
CM LABELED COMMON LENGTH	5179	335	

## SUBROUTINE HSIINT2

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984    C
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996    C
997    C
998    C
999    C
1000  C

```

## SYMBOLIC REFERENCE MAP (9-11)

## ENTRY POINTS

## 1 HSIINT2

VARIABLES	SN	TYPE	RELOCATION	75	ALPHA	REAL	NAV
33 A	REAL	REAL	NAV	100	REAL	REAL	NAV
34 A	REAL	REAL	NAV	100	REAL	REAL	NAV
35 A	REAL	REAL	NAV	100	REAL	REAL	NAV
36 A	REAL	REAL	NAV	100	REAL	REAL	NAV
37 A	REAL	REAL	NAV	100	REAL	REAL	NAV
38 A	REAL	REAL	NAV	100	REAL	REAL	NAV
39 A	REAL	REAL	NAV	100	REAL	REAL	NAV
40 A	REAL	REAL	NAV	100	REAL	REAL	NAV
41 A	REAL	REAL	NAV	100	REAL	REAL	NAV
42 A	REAL	REAL	NAV	100	REAL	REAL	NAV
43 A	REAL	REAL	NAV	100	REAL	REAL	NAV
44 A	REAL	REAL	NAV	100	REAL	REAL	NAV
45 A	REAL	REAL	NAV	100	REAL	REAL	NAV
46 A	REAL	REAL	NAV	100	REAL	REAL	NAV
47 A	REAL	REAL	NAV	100	REAL	REAL	NAV
48 A	REAL	REAL	NAV	100	REAL	REAL	NAV
49 A	REAL	REAL	NAV	100	REAL	REAL	NAV
50 A	REAL	REAL	NAV	100	REAL	REAL	NAV
51 A	REAL	REAL	NAV	100	REAL	REAL	NAV
52 A	REAL	REAL	NAV	100	REAL	REAL	NAV
53 A	REAL	REAL	NAV	100	REAL	REAL	NAV
54 A	REAL	REAL	NAV	100	REAL	REAL	NAV
55 A	REAL	REAL	NAV	100	REAL	REAL	NAV
56 A	REAL	REAL	NAV	100	REAL	REAL	NAV
57 A	REAL	REAL	NAV	100	REAL	REAL	NAV
58 A	REAL	REAL	NAV	100	REAL	REAL	NAV
59 A	REAL	REAL	NAV	100	REAL	REAL	NAV
60 A	REAL	REAL	NAV	100	REAL	REAL	NAV
61 A	REAL	REAL	NAV	100	REAL	REAL	NAV
62 A	REAL	REAL	NAV	100	REAL	REAL	NAV
63 A	REAL	REAL	NAV	100	REAL	REAL	NAV
64 A	REAL	REAL	NAV	100	REAL	REAL	NAV
65 A	REAL	REAL	NAV	100	REAL	REAL	NAV
66 A	REAL	REAL	NAV	100	REAL	REAL	NAV
67 A	REAL	REAL	NAV	100	REAL	REAL	NAV
68 A	REAL	REAL	NAV	100	REAL	REAL	NAV
69 A	REAL	REAL	NAV	100	REAL	REAL	NAV
70 A	REAL	REAL	NAV	100	REAL	REAL	NAV
71 A	REAL	REAL	NAV	100	REAL	REAL	NAV
72 A	REAL	REAL	NAV	100	REAL	REAL	NAV
73 A	REAL	REAL	NAV	100	REAL	REAL	NAV
74 A	REAL	REAL	NAV	100	REAL	REAL	NAV
75 A	REAL	REAL	NAV	100	REAL	REAL	NAV
76 A	REAL	REAL	NAV	100	REAL	REAL	NAV
77 A	REAL	REAL	NAV	100	REAL	REAL	NAV
78 A	REAL	REAL	NAV	100	REAL	REAL	NAV
79 A	REAL	REAL	NAV	100	REAL	REAL	NAV
80 A	REAL	REAL	NAV	100	REAL	REAL	NAV
81 A	REAL	REAL	NAV	100	REAL	REAL	NAV
82 A	REAL	REAL	NAV	100	REAL	REAL	NAV
83 A	REAL	REAL	NAV	100	REAL	REAL	NAV
84 A	REAL	REAL	NAV	100	REAL	REAL	NAV
85 A	REAL	REAL	NAV	100	REAL	REAL	NAV
86 A	REAL	REAL	NAV	100	REAL	REAL	NAV
87 A	REAL	REAL	NAV	100	REAL	REAL	NAV
88 A	REAL	REAL	NAV	100	REAL	REAL	NAV
89 A	REAL	REAL	NAV	100	REAL	REAL	NAV
90 A	REAL	REAL	NAV	100	REAL	REAL	NAV
91 A	REAL	REAL	NAV	100	REAL	REAL	NAV
92 A	REAL	REAL	NAV	100	REAL	REAL	NAV
93 A	REAL	REAL	NAV	100	REAL	REAL	NAV
94 A	REAL	REAL	NAV	100	REAL	REAL	NAV
95 A	REAL	REAL	NAV	100	REAL	REAL	NAV
96 A	REAL	REAL	NAV	100	REAL	REAL	NAV
97 A	REAL	REAL	NAV	100	REAL	REAL	NAV
98 A	REAL	REAL	NAV	100	REAL	REAL	NAV
99 A	REAL	REAL	NAV	100	REAL	REAL	NAV
100 A	REAL	REAL	NAV	100	REAL	REAL	NAV



SUBROUTINE HSIN12 76/74 OPTED IPAGE

-FTN 4.5+P456

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PAGE

2

## VARIABLES SN TYPE RELOCATION

112	FILATT	REAL	ARRAY	NAV	225	GAINS	REAL	NAV
71	G92P	REAL	ARRAY	NAV	74	H	REAL	NAV
15	HSOTHC	REAL	ARRAY	INPUTS	14	HSOTHC	REAL	NAV
137	HV92P	REAL	ARRAY	NAV	11	I	INTEGER	NAV
7	ICMCVL	INTEGER	CONTROL	NAV	13	ICMCVL	INTEGER	NAV
22	IRLIM	INTEGER	INPUTS	NAV	263	IGATP	INTEGER	NAV
21	IPUTYP	INTEGER	INPUTS	NAV	21	INCDR	INTEGER	NAV
5	INTY	INTEGER	CONTROL	NAV	51	IOOHL	INTEGER	NAV
23	IOC	INTEGER	ARRAY	INPUTS	5	ISOP	INTEGER	NAV
17	ITRATT	INTEGER	INPUTS	NAV	57	ITRATT	INTEGER	NAV
16	ITPNAV	INTEGER	INPUTS	NAV	125	LAT	REAL	NAV
106	LONG	REAL	NAV	NAV	213	ONX	REAL	NAV
214	ONDY	REAL	NAV	NAV	215	ONZ	REAL	NAV
222	OFILTP	REAL	ARRAY	NAV	176	ONH	REAL	NAV
0	OTIME	REAL	CONTROL	NAV	142	OV92P	REAL	NAV
5	PLOTIM	REAL	INPUTS	NAV	2	PLTIME	REAL	NAV
6	PHIT	REAL	INPUTS	NAV	1	PTIME	REAL	NAV
216	Q2P45	REAL	ARRAY	NAV	3	Q-SID	REAL	NAV
17	RHO	REAL	ARRAY	NAV	65	PCMAX	REAL	NAV
3	STIME	REAL	CONTROL	NAV	7	PSIDY	REAL	NAV
76	SALF	REAL	NAV	NAV	15	QFATP	REAL	NAV
62	SSXV	REAL	INPUTS	NAV	53	SSYD	REAL	NAV
64	SSZD	REAL	INPUTS	NAV	145	SSPHI	REAL	NAV
4	STOP	REAL	INPUTS	NAV	55	THFST	REAL	NAV
63	THYCOO	REAL	ARRAY	NAV	13	TOLJOK	REAL	NAV
60	THITPO	REAL	ARRAY	NAV	1	TOUTAT	REAL	NAV
4	TPCFV	REAL	CONTROL	NAV	104	V94P	REAL	NAV
42	TPESIO	REAL	ARRAY	INPUTS	107	V92	REAL	NAV
2	TQUANT	REAL	INPUTS	NAV	12	WT	REAL	NAV
11	V92P	REAL	ARRAY	NAV	125	YCALF	REAL	NAV
66	XV	REAL	ARRAY	NAV	124	XCALF	REAL	NAV
152	XH	REAL	NAV	NAV	147	XV32P	REAL	NAV
146	XSPHI	REAL	NAV	NAV				
126	XOP92P	REAL	ARRAY	NAV				

## STATEMENT LABELS

3 1C

LOCUS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
3, 1C	I	I	29 30	59	INSTACK

## COMMON BLOCKS

COMMON	BLOCKS	LENGTH
CONTROL	9	
INPUTAT	67	
INPUTS	56	
NAV	182	

## STATISTICS

PROGRAM	LENGTH	128	10
CM LABELS <td>COMMON LENGTH</td> <td>4728</td> <td>314</td>	COMMON LENGTH	4728	314

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1      C
2      C
3      C
4      C
5      C
6      C
7      C
8      C
9      C
10     C
11     C
12     C
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15     C
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17     C
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89     C
90     C
91     C
92     C
93     C
94     C
95     C
96     C
97     C
98     C
99     C
100    C

```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS			
4	VSM		
VARIABLES			
0	ARG	SN	TYPE
0	ARG	REAL	RELOCATION
0	SINPH	INTEGER	FAD.
0	SINPH	INTEGER	SINPH
22	0	0	INTEGER
21	VSM	0	PEAL
EXTERNALS			
0	ARG	SN	TYPE
0	ARG	REAL	RELOCATION
0	SINPH	INTEGER	FAD.
0	SINPH	INTEGER	SINPH
22	0	0	INTEGER
21	VSM	0	PEAL
COMMON BLOCKS			
0	ARG	SN	TYPE
0	ARG	REAL	RELOCATION
0	SINPH	INTEGER	FAD.
0	SINPH	INTEGER	SINPH
22	0	0	INTEGER
21	VSM	0	PEAL
STATISTICS			
0	ARG	SN	TYPE
0	ARG	REAL	RELOCATION
0	SINPH	INTEGER	FAD.
0	SINPH	INTEGER	SINPH
22	0	0	INTEGER
21	VSM	0	PEAL

FUNCTION VCOS 7474 OPI=0 IRACE

026537  
026540  
026553  
026563  
026577  
026583  
026590  
026603

1 REAL FUNCTION VCOS (APG)  
COMMON/COSPH/COSPH  
REAL APG,VSINCO  
INTEGER Q,COSPH  
Q=2  
VCOS=VSINCO (ARG,Q,COSPH)  
RETURN  
END

SYMBOLIC REFERENCE MAP (P=1)

## ENTRY POINTS

4 VCOS

VARIABLES	SW	TYPE	PELOCATION	0	COSPH	INTEGER	REAL	COSPH
Q	APG	REAL	F.3.	17	VCOS			
20	Q	INTEGER						

EXTERNALS

VSINCO TYPE APG

REAL 3

COMMON BLOCKS

COSPH 1

## STATISTICS

COMMON LENGTH	213	17
CM LABELED COMMON LENGTH	13	1

```

1      0FAL FUNCTION VSINCO (X,0,IPATH)
      INTEGER Q=0,Q1=02,Q4
      INTEGER IIFM(18)
      REAL CDEF(17,2)
      C X40PI 15 4*PI
      DATA X40PI/1.27323954473516268451450/
      DATA CDEF/-.369534397-4, .249001307F-2, -.007459, .2524-1
1      1.76532916085450,0.E0,0.E0,0.E0
2      2.16572149549F-9, .249039114533F-2, -.00745512012793F-1
10     3.1.76532916085450,0.E0,0.E0
4      4.1.736428801F-8, .312374188248F-5, -.36576191927578F-4
5      5.1.24903911453372740F-2, -.00745512012793F-1
6      6.1.785194163297464771F0,0.E0, .5877160149F-11
7      7.1.1757143202795F-9, .312374188248F-5, -.36576191927578F-4
15     8.1.24903911453372740F-2, -.00745512012793F-1
9      9.1.7451951531974433701450
A      A.1.31872781F-3, .1584968415F-1, -.36842414558F0
1      1.1.99999996734F0,0.E0,0.E0,0.E0
2      2.1.15849684153225F-1, -.36842414558F0, .9999999999999999
3      3.0.E0,0.E0, -.2426365992F-7, .350346323677F-5
4      4.1.3259916767495F-3, .15849684153225F-1
5      5.1.10842513752954715F0, .9999999999999999
6      6.1.11307412637F-9, .2451945716514F-7, .350346323677F-5
7      7.1.32599167674954715F0, .9999999999999999
25     8.1.30842513753413722947F0, .9999999999999999
9      9.1.30842513753413722947F0, .9999999999999999
      DATA IIFOMS/4.5,6.7,4.5,6.7/
      ZYDPI,ABS(X),X,ACOS(X)
      C THE EXPANSIONS ACTUALLY COMPUTE SIN(PI/4*Z) AND COS(PI/4*Z)
30     C WHERE 0<=Z<1.
      C Z=AMOD(Z,1.E0)
      C BREAK Z INTO ITS INTEGER AND FRACTIONAL PARTS
      Q=INT(Z)
      Q=MOD(Q,Q1)
      C HALF QUADRANT IN WHICH THE ANGLE FALLS, AFTER ADJUSTMENT FOR THE
      C SIGN OF THE ARGUMENT AND WHETHER SIN OR COS WAS CALLED
      Q1=Q/4
      C 0 TO PI OR PI TO 3*PI
      C Z=MOD(Q,Q1)
40     C HALF QUADRANT IN ONE OF FIRST TWO QUADRANTS
      IIFM(Q1,2) =F. 3) P=V2(1,-2)
      C IF HALF QUADRANT IS 1 OR 3, REFLECT ANGLE IN HALF QUADRANT
      Q=Q-V2(1,2)
      Q4=1
45     C IF(Q1.E0,0,OR,02.EQ,3) Q4=0
      C Q4=0 IMPLIES SINE EXPN(Q2=0,1),-1 IMPLIES COSINE
      IIFM=IPATH+Q4
      C SELECT PROPER POLYNOMIAL EXPANSION
      IIFM=1+IIFM*SIGN(X)
      C NUMBER OF TERMS IN EXPANSION
      VSINCO=V2(CDEF(1,IIFM),IIFM)
      C START EVALUATING POLYNOMIAL
      DO 130 J=2,IIFM
      EVALMATIC=VSINCO+V2(CDEF(J,IIFM),J)*VSINCO*VSINCO
      VSINCO=VSINCO+V2(CDEF(J,IIFM),J)*VSINCO*VSINCO
      IF (J.E0,1) VSINCO=VSINCO*VSINCO

```



VARIABLE PRECISION ROUTINES  
STORAGE ALLOCATION.

COMPASS 3.75051. 05/25/75 17.19.11.

PAGE 1

BINARY CONTROL CAPS.

ADDRESS	LENGTH
2	43
45	

IDENT VP,VP  
END

BLOCKS	TYPE	ADDRESS	LENGTH
PROGRAM	LOCAL	0	45
POCIS	COMMON	0	2
VPPTH	COMMON	0	1

ENTRY POINTS.

VP	2	VPINIT	36+

INCHT V2,VP  
ENTRY VP  
ENTRY VP

THIS ROUTINE IMPLEMENTS THE PRECISION VARYING FUNCTION BY ROUNDING AND TRUNCATING ITS INPUT. THE ROUTINE IS CALLED AS A FUNCTION SUBPROGRAM BY THE FORTRAN CALL (VPRARG), WHERE ARG IS THE INPUT TO THIS ROUTINE.

#### INPUTS:

ARG - A COMPLEX SINGLE PRECISION FLOATING POINT WORD. THE ROUTINE WILL GENERATE ACCURATE RESULTS FOR REAL, COMPLEX, AND OF THE UNDERFLOW REPRESENTATIONS, AND ANY UNREALIZED VALUE OF FLOATING POINT NUMBER. POSITIVE UNDERFLOW, NEGATIVE UNDERFLOW, POSITIVE INDEFINITE, AND NEGATIVE INDEFINITE VALUES ARE RETURNED UNCHANGED.  
VPRG - A COMMON BLOCK CONTAINING ONE FIXED POINT FULLWORD. IT IS ROUND, WHICH, IF NON, REQUESTS ROUNDING PRIOR TO TRUNCATING. AN EVEN VALUE OF VPRG CAUSES TRUNCATION ONLY.  
PRECIS - A COMMON BLOCK CONTAINING TWO FIXED POINT FULLWORDS. THE FIRST IS FRAC1, WHICH IS THE NUMBER OF BINARY BITS OF EXACTION TO BE KEPT (THIS ROUTINE, IN ESSENCE, SIMULATES A COMPUTER WITH A BINARY EXPONENT AND EXACTION FLOATING POINT REPRESENTATION). WE EXAMINE THIS VALUE EACH TIME IT IS INVOKED, THEREBY ALLOWING OPERAND PRECISION TO BE STIMULATED AT EXECUTION TIME. THE SECOND WORD OF THE COMMON BLOCK IS EXPR, WHICH IS THE NUMBER OF BITS IN THE BINARY EXPONENT. THIS VALUE IS EXAMINED ONLY DURING A CALL TO THE INITIALIZE (WHICH IS INVOKED BY THE FORTRAN SUBROUTINE CALL, CALL VPRG), WHICH SETS THE NUMBER OF BITS IN THE BINARY EXPONENT. THIS VALUE REMAINS UNCHANGED UNTIL THE NEXT (IF ANY) CALL TO VPRG. IF NO CALLS TO VPRG ARE MADE, THE DEFAULT VALUE OF 8 IS USED.

#### OUTPUTS:

IN ACCORDANCE WITH COMPLEX FORTRAN LINKAGE CONVENTIONS, THE RESULT IS RETURNED IN REGISTER X0.6. IF A SOFTWARE UNDERFLOW IS DETECTED (THAT IS, WHEN THE EXPONENT IN THE COMPLEX REPRESENTATION COULD NOT BE REPRESENTED ON A COMPUTER WITH A BINARY EXPONENT LENGTH AS SET BY THE MOST RECENT CALL TO VPRG), THE RESULT IS SET TO ZERO. UNDERFLOWS ARE HANDLED SIMILARLY.

#### ALGORITHM:

TO ROUND THE RESULT TO THE DESIRED PRECISION, WE CONSTRUCT A FLOATING POINT WORD WHOSE EXPONENT IS THE SAME AS THAT OF THE INPUT, AND WHOSE COEFFICIENT HAS A 1 IMMEDIATELY TO THE RIGHT OF THE LEAST SIGNIFICANT BIT OF THE COEFFICIENT IN ACCORDANCE. THE ROUNDING IS DONE IF EITHER WORD IS EVEN OR IF THE FRAC1 IS 48). THE ROUNDING IS DONE BY ADDING A BINARY ONE TO THE LEAST SIGNIFICANT BIT OF THE COEFFICIENT. THAT ONE BEING A SIGNIFICANT BIT IN THE SIMULATED RESULT. THE EXPONENT IS THEN CHECKED AGAINST PRECOMPUTED LIMITS TO DETERMINE IF AN UNDERFLOW OR OVERFLOW CONDITION EXISTS.

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FIN 4.5+7425 05/25/75 17.12.47

FUNCTION VSINGO 74774 OPER PAGE

STATEMENT LABELS  
0 100

LOOPS LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES	EXT. PEES
64 100	J	53 55	200		

STATISTICS  
PROGRAM LENGTH 2468 165



127709

\*1010CF, 19/VP

VFO

0 262055555555555500002 +

## VARIABLE PRECISION ROUTINES

COMPASS 3.75951. 05/25/76 17.19.21.

PAGE

LINE	ADDRESS	DATA	VP	ROUTINE	COMMENT
1	00000000000000000000	DATA	0		ADDRESS, WORD
2	0400000002 +	ED	*+1517		STANDARD FOR 50000000000000000000
3	53110 0351000024 +	SA1	X1	X1, OUTRANGE	X1 HAS ADDRESS OF APC
4	5120000000 C	SA2			X1 HAS ADDRESS OF APC
5	0322000024 +	SA2			ADDRESS OF 10000000000000000000
6	5120000000 C	SA2			ADDRESS OF 10000000000000000000
7	5120000000 C	SA2			ADDRESS OF 10000000000000000000
10	0322000014 +	SA2			ADDRESS OF 10000000000000000000
11	11553 21501	SA2			ADDRESS OF 10000000000000000000
12	14555	SA2			ADDRESS OF 10000000000000000000
13	27445	SA2			ADDRESS OF 10000000000000000000
14	11613 0321000015 +	SA2			ADDRESS OF 10000000000000000000
15	26116	SA2			ADDRESS OF 10000000000000000000
16	612077517	SA2			ADDRESS OF 10000000000000000000
17	6712000025 +	SA2			ADDRESS OF 10000000000000000000
20	6120300117	SA2			ADDRESS OF 10000000000000000000
21	0621000002 +	SA2			ADDRESS OF 10000000000000000000
22	5113000030 +	SA2			ADDRESS OF 10000000000000000000
23	5110000026 +	SA2			ADDRESS OF 10000000000000000000
24	13611	SA2			ADDRESS OF 10000000000000000000
25	13611	SA2			ADDRESS OF 10000000000000000000
26	40000000000000000000	SA2			ADDRESS OF 10000000000000000000
27	6120000000	SA2			ADDRESS OF 10000000000000000000



05/25/75 17:19.11.

COMPASS 3.75051.

# VARIABLE PRECISION ROUTINES SYMBOLIC REFERENCE TABLE.

PUTG	26	PROGRAM*	3/13	7/54 L	4/91	4/11
CHECKXPO	15	PROGRAM*	3/22	3/37 L		
EXPOL	1	PRECIS	4/09	4/29 L		
FRACTL	0	PRECIS	3/08	4/23 L		
MASK	31	PROGRAM*	4/02 L	4/15		
OUTRANGE	24	PROGRAM*	3/06	3/10	1/48	3/50 L
OVERFL	22	PROGRAM*	3/47 L			
OVERH	26	PROGRAM*	3/49	4/01 0		
OVERP	30	PROGRAM*	3/47	3/57 L		
ROUND	0	VERBIL	3/16	4/31 L		
SETP2	27	PROGRAM*	3/55 L	4/21		
SETHI	20	PROGRAM*	3/44 L	4/25 S		
SETLO	16	PROGRAM*	1/18 L	4/27 S		
TRUNC	14	PROGRAM*	3/18	3/11 L		
UNOFL	25	PROGRAM*	3/43	3/52 L		
VP	2	PROGRAM*	2/22 F	2/52	3/22 L	3/46
VPINIT	34	PROGRAM*	2/23 F	4/13	4/18 L	4/26
WORDOK	13	PROGRAM*	3/26	3/29 L		

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1      C      THIS IS THE SQUARE ROOT SUBROUTINE FOR USE IN CONJUNCTION
2      C      WITH THE PRECISION VARYING ROUTINE. IT COMPUTES THE
3      C      SQUARE ROOT OF A DOUBLE PRECISION INPUT ARGUMENT BY ONE
4      C      OF FOUR ALGORITHMS: THESE PATHS DIFFER IN TERMS OF THE
5      C      OF FLUANT PRECISION. FOR AN ANALYSIS OF THE ALGORITHMS
6      C      SEE THE DOCUMENTED ANALYSIS.
7
8      C      IN BROAD TERMS, THE SQUARE ROOT IS COMPUTED AS FOLLOWS:
9      C      A. REDUCE THE RANGE BY REEXPRESSING ARG AS NEWARG TIMES
10     C      FACTOR SQUARED.
11     C      B. TAKE AN INITIAL APPROXIMATION TO THE SQUARE ROOT OF
12     C      NEWARG BY USING A POLYNOMIAL EXPANSION.
13     C      C. USE ONE OF MORE NEWTON'S ITERATIONS TO REFINES THE RESULT
14     C      D. OUTPUT THE RESULT AS SORT(NEWARG)*FACTOR
15
16     C
17
18     C      REAL FUNCTION VSORT (ARG)
19     C      INTEGER SORTPH,ITERMS(4)
20     C      REAL NEWARG,COFF(5,4)
21     C      COMMON /SD PATH/SORTPH
22     C      DATA ITERMS/5,3,4,5/
23     C      NUMBER OF COEFFICIENTS IN THE EXPANSION USED FOR EACH PATH
24     C      DATA COEFF/-323973453E0,1.062456525E0,-1.475865907E0,1.5462974
25     C      1656E0,1.194521794E0,-3163221431E0,1.022321187E0,2592768763E0
26     C      1 1.0E0,0.0E0,-.287369824E0,-.82589491E0,1.32765186E0
27     C      1 1.27018672E0,0.0E0,-.323973453E0,1.062456525E0
28     C      1 -1.475865907E0,1.546297455E0,1.904521794E0 /
29     C      IF (ABS(1.0-2.0*1.0)
30     C      VSORT= SORT(ARG)
31     C      NEGATIVE ARG. USE ERROR FACILITY OF SYSTEM
32     C      RETURN
33
34     C      20 VSORT=C.
35     C      7E0 ARG
36     C      RETURN
37
38     C      30 CALL VSORTUP(ARG,NEWARG,FACTOR)
39     C      POSITIVE ARGUMENT, RESCALE IT.
40     C      PATH=COOPT
41     C      IF (IPATH.LE. 0 .OR. IPATH.GT. 4) IPATH=4
42     C      SELECT PATH AS 1,2,3, OR 4
43     C      J=ITERMS(IPATH)
44     C      NUMBER OF TERMS IN INITIAL EXPANSION
45     C      VSORT=VPI(COEF(1,IPATH))
46     C      LOOP OVER REMAINING TERMS
47     C      DO 100 I=2,J
48     C      VSORT=VSORT*(COEF(I,IPATH)+VSORT*NEWARG)
49     C      COMPUTE POLYNOMIAL IN SUCH A WAY AS TO MAXIMIZE SIGNIFICANCE
50     C      IF (IPATH.NE. 1) VSORT=VSORT*(5*VSORT VSORT +
51     C      1 VSORT*NEWARG/VSORT)
52     C      IF PATH IS NOT 1, TAKE A NEWTON'S ITERATION
53     C      X=VSORT(NEWARG/VSORT)
54     C      TEMP RESULT
55     C      VSORT=VSORT*(FACTOR*VSORT+VSORT*(VSORT-X))
56     C      TAKE ANOTHER ITERATION AND LOOP OF SCALE
57     C      RETURN
58     C      END

```

SYMBOLIC REFERENCE MAP (P=1)

ENTRY POINT  
4 VSOP1

VARIABLES	SN	TYPE	SELOCATION F.P.	153	COEF	REAL	INTEG	ARRAY
142 FACTOR		REAL		145	I	INTEG		
143 IPATH		INTEG		147	INTEG	INTEG		ARRAY
144 J		INTEG		141	INTEG	INTEG		
2 SOPPH		INTEG	SOPPH	143	VSOP1	REAL		
146 K		REAL						

EXTERNALS	TYPE	ARGS	VP	REAL	1
VSOP1	REAL	1	VSOP1		

STATEMENT LABELS	INACTIVE	13	20	10	30
0 10					
0 100					

LOOPS LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
15 100	I	44 45	200	EXT REFS

COMMON BLOCKS	LENGTH	1
SOPPH		

STATISTICS	PROGRAM LENGTH	1773	127
14 Labeled Common Length		19	1

SQUARE POOL SUPPORT ROUTINE  
STORAGE ALLOCATION.

COMPASS 3.75051 05/25/76 17.11.52.

PAGE 1

ADDRESS	LENGTH	BINARY CONTROL CARDS.
2	12	INENT VSOSUP, VSOSUP
14		END

ENTRY POINTS.

VSOSUP 24





CONPASS 3.75051. 05/25/76 17.19.57. 010F

SQUARE ROOT SUPPORT ROUTINE

11 5021000062 SA2 A1+2 ADDRES OF FACTOR 029929  
12 53723 SA7 X2 RETURN VALUE OF FACTOR TO CALLEE 029930  
13 0400000002 + EO V50SUP RETURN TO CALLEE 029940  
14 00004000000000000000 IM047 12/9/76 17-02.47/07. 2\*\*47 029950  
END 029960

47400 CM STORAGE USED 63 STATEMENTS 3 SYMBOLS  
MODEL 74 1SSEMBLY 3.296 SECONDS 9 REFERENCES

SQUADRON SUPPORT ROUTINE  
SYMBOLIC REFERENCE TABLE.

COMPASS 3.75041..... 05/25/76 17.19.51.

0000

POSEXP0	5	PROGRAM*	2/44	2/46 L
Y4047	13	PROGRAM*	2/49	3/34 L
VSQSUP	2	PROGRAM*	2/02 r	2/15
			2/27 L	3/03

REAL FUNCTION VATAN2 (YAPG,YARG)

C THIS IS THE VARIABLE PROCESSION ARGUMENT ROUTINE  
C OF TWO ARGUMENTS. IF ONE INTERPRETS THE FIRST  
C ARGUMENT AS A Y-COORDINATE AND THE SECOND ARG  
C AS AN X-COORDINATE, THEN THE ARC TANGENT VALUE RETURNED  
C IS THE ANGLE MEASURED IN A COUNTERCLOCKWISE DIRECTION,  
C BETWEEN THE X-AXIS AND THE LINE SEGMENT JOINING THE  
C ORIGIN AND THE POINT(X,Y) IN CARTESIAN COORDINATES.  
C  
C INPUTS: YAPG AND YARG AS DESCRIBED ABOVE (FLOATING POINT).  
C VATAN2 SETS AN EXPANSION (EXPLAINED BELOW) ON THE BASIS  
C OF ATNPH, WHICH IS AVAILABLE IN THE COMMON BLOCK OF  
C THE SAME NAME.

C QUERIES

C VATAN2 RETURNS A FLOATING-POINT QUANTITY, WHICH IS  
C THE PRINCIPAL VALUE OF THE ARC TANGENT, LOCATED BETWEEN  
C -PI AND PI (THE VALUE IS EXPRESSED IN RADIANS).

C ALGORITHMS

C SET ATTACHED DOCUMENTATION. IN GENERAL, SEVERAL RANGE  
C REDUCTIONS ARE USED TO REDUCE THE EVALUATION TO  
C THE CASE OF AN ANGLE BETWEEN 0 RADIANS AND ARCTAN(PI/12).  
C  
C  
C  
C THIS VALUE IS COMPUTED BY A POLYNOMIAL EXPANSION. THE  
C RESULT OF THIS IS THEN EXPANDED TO THE DESIRED VALUE.

C REAL COEFF(1,4)

C INTEGER ITERS(4)

C LOGICAL REDUC1,REDUC2,REDUC3

C INTEGER ATNPH

C COMMON /ATNPH/ATNPH

C DATA ITERS/4,6,7,8/

C DATA COEFF/-.12811334E0,.1993575694E0,-.1333242344E0  
1 .939999979773E0, 0.0E0,0.0E0,0.0E0  
2 -.76123477E-1,.179942916947E0,-.142915242007E0  
3 .13999993034937E0,-.33333332904721E0,.93999999999579E0  
4 .0.0E1,0.0E1,0.0E2,1.7241E-1,-.84522932997E-1,  
5 .11104745432E0,-.1429549420545E0,.1399999999957322E1  
6 -.1333333324648294E0,.9999999999999999E0,0.0E0,  
7 -.5209593904E-1,.753071491348E-1,-.901132224705E-1  
8 .11107941466294E0,-.142957795649402E0,  
9 .1999999999999999E0,-.3333333333333333E0  
A .9999999999999999E0,0.0E0,0.0E0,0.0E0

C DATA ITERS/-.26794919243112270E0,PI/3,.14159265358979323E0  
C DATA SQR/1.732050807568877E0,50.0E0,PI/1.732050807568877E0/  
C DATA PI02/1.5707963267949665192E0,PI04/.523598775598298371E0/  
C REDUC1=.FALSE.  
C REDUC2=.FALSE.  
C REDUC3=.FALSE.

C INITIALIZE SWITCHES TO INDICATE RANGE REDUCTIONS NOT MADE

C IF (YARG) 10,20,30

C TEST YARG FOR MINUS, ZERO, OR PLUS

C IF YARG=0.0E0

C IF YARG=0.0E0

C IF YARG=0.0E0

C IF YARG=0.0E0



17.12.42

14.5.42

FUNCTION VARIAN2 14.74 ORIED IRACE

CARD NO. SEVERITY DETAILS DIAGNOSIS OF PROBLEM  
 47 I CONSTANT 100 LONG. HIGH ORDER DIGITS RETAINED, BUT SOME PRECISION LOST.  
 48 I CONSTANT 100 LONG. HIGH ORDER DIGITS RETAINED, BUT SOME PRECISION LOST.  
 49 I CONSTANT 100 LONG. HIGH ORDER DIGITS RETAINED, BUT SOME PRECISION LOST.  
 50 I CONSTANT 100 LONG. HIGH ORDER DIGITS RETAINED, BUT SOME PRECISION LOST.

SYMBOLIC REFERENCE MAP (PEL)

ENTRY POINTS  
 4 VARIAN2

VARIABLES	SN	TYPE	PELOCATION
249 AFG	232	REAL	ARGSO
250 I	235	INTEGER	COTE
251 I	236	INTEGER	IOATH
252 I	237	INTEGER	J
253 I	238	INTEGER	PIOV2
254 I	239	REAL	PIOV2
255 I	240	REAL	PIOV2
256 I	241	REAL	PIOV2
257 I	242	REAL	PIOV2
258 I	243	REAL	PIOV2
259 I	244	REAL	PIOV2
260 I	245	REAL	PIOV2
261 I	246	REAL	PIOV2
262 I	247	REAL	PIOV2
263 I	248	REAL	PIOV2
264 I	249	REAL	PIOV2
265 I	250	REAL	PIOV2
266 I	251	REAL	PIOV2
267 I	252	REAL	PIOV2
268 I	253	REAL	PIOV2
269 I	254	REAL	PIOV2
270 I	255	REAL	PIOV2
271 I	256	REAL	PIOV2
272 I	257	REAL	PIOV2
273 I	258	REAL	PIOV2
274 I	259	REAL	PIOV2
275 I	260	REAL	PIOV2
276 I	261	REAL	PIOV2
277 I	262	REAL	PIOV2
278 I	263	REAL	PIOV2
279 I	264	REAL	PIOV2
280 I	265	REAL	PIOV2
281 I	266	REAL	PIOV2
282 I	267	REAL	PIOV2
283 I	268	REAL	PIOV2
284 I	269	REAL	PIOV2
285 I	270	REAL	PIOV2
286 I	271	REAL	PIOV2
287 I	272	REAL	PIOV2
288 I	273	REAL	PIOV2
289 I	274	REAL	PIOV2
290 I	275	REAL	PIOV2
291 I	276	REAL	PIOV2
292 I	277	REAL	PIOV2
293 I	278	REAL	PIOV2
294 I	279	REAL	PIOV2
295 I	280	REAL	PIOV2
296 I	281	REAL	PIOV2
297 I	282	REAL	PIOV2
298 I	283	REAL	PIOV2
299 I	284	REAL	PIOV2
300 I	285	REAL	PIOV2

EXTERNALS  
 ATAN2 REAL TYPE ARCS  
 2 LIBRARY VP REAL

INLINE FUNCTIONS  
 ARCS REAL TYPE ARCS  
 1 INTRIN REAL REAL INTRIN

STATEMENT LABELS  
 0 10 INACTIVE 20 20  
 30 40 41 100  
 0 300

LOOPS LABEL INDEX FROM-TO LENGTH PROPERTIES  
 107 300 \* 1 81 85 178 FVT DEFS

COMMON BLOCKS LENGTH  
 ATNPTH 1

STATISTICS  
 PROGRAM LENGTH 3010 103  
 OF LABELED COMMON LENGTH 14 1

\*\*\*\*\* INEXLKC //// END OF LIST ////





```

115 IF (IMUTYP.EQ.3) WRITE(6,634) HSOIIM,HTOING
    634 FORMAT('HIGH SPEED STABILIZATION WILL START',
    1 ' AT TIME ',G11.5,' AND HAPPEY EVERY ',G11.5,' SECONDS')
    IF ((LOC4251.NE.3).AND.(LOC4251.EQ.16,634).EQ.16,634).EQ.16,634)
    1 I=1,3, J=1,12)
120 633 FORMAT('ATTITUDE FILIP TOLFRANCE, ZMAX: ',G11.5,
    1 ' OSMAX: ',G11.5,' FIXO GAINSCOLU4015E)='
    2 633(1X,G11.5),5X,3(1X,G11.5),5X,7(1X,G11.5)/)
    3 IFF(6,692)
125 692 FORMAT('THIS VERSION DOES NOT IMPLEMENT VARIABLE PRECISION')
    GO TO (701,532,993),IMUTYP
    991 CALL LLINI
    GO TO 429
    992 CALL SSINI
    GO TO 429
    993 CALL SDINI
    GO TO 429
    1 CONTINUE
    GO TO (110,103,200),IMUTYP
135 C THIS LOOP REFORMS INPUT, IMU MODELING, AND ATTITUDE
    C CALCULATIONS WHEN LOCAL-LEVEL WANDER=AZIMUTH (LLRA)
    C PLATFORM STABILIZATION IS SELECTED
    C
    10 DO 30 I=1,ITPNAV
    20 25 J=1,ITPAV
    11 CALL INPC
    IF (ISTOP.EQ.10) GO TO 585
    IF (TIME.GT. STOP) GO TO 529
    CALL LLING
    IS (TIME.NE. IPEV.OP. ISTOP.NE.0) GO TO 20
    DO 19 K=1,3
    19 SCAP(K)=SFOT(K)
    GO 13,11
    20 IPEV=TIME
    25 CALL CHING
    CALL LLATON
    CALL LLALT
    IF (I.EQ. ITPNAV) CALL IMPNAV
    CALL AIUT
    IF (MOD(I,ITPFI).EQ.0) CALL ATFTL
    C FILIP THE ALTITUDE DATA IF IT IS TIME
    30 CONTINUE
    GO TO 400
    C
    C THIS LOOP REFORMS INPUT, IMU MODELING, AND ATTITUDE
    C CALCULATIONS WHEN SPACE STABLE PLATFORM STABILIZATION IS
    C SELECTED
    C
    100 DO 130 I=1,ITPNAV
    125 J=1,ITPAV
    101 CALL INPC
    IF (ISTOP.EQ.10) GO TO 505
    IF (TIME.GT. STOP) GO TO 529
    CALL SSING
    IF (TIME.NE. IPEV.OP. ISTOP.NE.0) GO TO 120
    119 K=1,3

```



```

119 SF9IP(X)=SF9I(X)
120 IPREV=TIME
125 CALL CHING
    CALL SSATUD
    IF (I1.EQ. IIRNAV) CALL SSIFRM
    IF (I1.EQ. IIRNAV) CALL IMPNAV
    CALL STATI
    CALL ATUDF
    IF (MONI.IREIL).EQ.0) CALL ALIFIL
    FILTER THE ATTITUDE DATA IF IT IS TIME
130 CONTINUE
    GO TO 400

145 C
    C THIS LOOP PERFORMS INPUT, TWO MODELING, ATTITUDE, AND
    C VELOCITY SMOOTHING CALCULATIONS WHEN SIPAP=0000. INU
    C STABILIZATION IS SELECTED
    C
190 C
    C 200 DO 210 I=1, IIRNAV
    C 205 J=1, IIRNAV
    C 201 CALL IPFEC
    IF (I1.EQ. IIRNAV) GO TO 500
    CALL SMITHG
    IF (TIME .NE. IPREV .OR. ISTOP .NE. 0) GO TO 220
    DO 205 K=1, 2
    C 219 SF9IP(K)=SF9I(K)
    GO TO 201
    C 220 IPREV=TIME
    C 225 CALL SMITHG
    CALL SMATUD
    CALL WSINTS
    IF (I1.EQ. IIRNAV) CALL WSINTS
    IF (I1.EQ. IIRNAV) CALL IMPNAV
    CALL ATUDF
    IF (MONI.IREIL).EQ.0) CALL ATFTL
    FILTER THE ATTITUDE DATA IF IT IS TIME
    C 270 CONTINUE
    C
210 C
    C THIS DATA IS COMMON TO ALL CONFIGURATIONS -- SECTIONS
    C CONTROL AND OUTPUT FUNCTIONS
    C
    C 400 CONTINUE
    420 IF (TIME .LT. PTIME .AND. TIME .LT. PLTIME) GO TO 500
    CALL OUTUNI
    IF (TIME .LT. PTIME) GO TO 440
    CALL PINTUD
    PTIME = TIME + PPRT
    IF (TIME .LT. PLTIME) GO TO 500
    440 CALL PLIAPF
    PLTIME = TIME + PLINTN
    500 IF (I1.EQ. IIRNAV) GO TO 1
    505 WRITE (510) ISTOP, IIRNAV
    510 STOP
    512 ***** SIMULATION FROM HERE *****
    512 ***** STOP *****
    512 ***** STOP *****
    520 UNTIL (I1.EQ.0) TIME, STOP

```

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521 FORMAT (2X,***** PRESENT TRAJECTORY TIME OF ",G14.8,
1  ".....EXCEEDS REQUESTED STOP TIME OF ",G14.8,
2  ".....SIMULATION TERMINATED")

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032799  
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## CAPD. NR. SEVERITY DETAILS DIAGNOSIS OF PERSON EN

AN IE STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTE GO TO STATEMENT.  
AN IF STATEMENT MAY BE MORE EFFICIENT THAN A 2 OR 3 BRANCH COMPUTE GO TO STATEMENT.

## SYMBOLIC REFERENCE MAP (P=1)

1256 3521  
WISNIK  
ENTBY PINTS

[illegible]

05/25/75 17.24.46

FIN 4.5+P4D6

PROGRAM RUNSIN 74/74 PRTED IDAGE

## VARIABLES SN TYPE RELOCATION

22	IFRLIM	INTEGER	INPUTS	263	IGAINP	INTEGER	ARRAY	NAV	INPUTS
21	IMUTYP	INTEGER	INPUTS	23	INCOR	INTEGER			
5	INIT	INTEGER	CONTROL	61	INPNLP	INTEGER	ARRAY	NAV	INPUTS
55	IPAGE	INTEGER	OUTPUT	23	IPC	INTEGER			
56	IPL14	INTEGER	OUTPUT	1225	IPOLY	INTEGER			
57	IPPLAT	INTEGER	OUTPUT	1223	IPOMT	INTEGER			
1226	IPPOD	INTEGER	PROFGE	1224	IPITE	INTEGER			
6	ISIDP	INTEGER	CONTROL	0	ITILE	INTEGER	ARRAY	NAV	OUTPUT
17	LIPATT	INTEGER	INPUTS	47	ITFIL	INTEGER			
16	LIPNAV	INTEGER	INPUTS	11543	J	INTEGER			
13544	K	INTEGER	INPUTS	195	LAT	REAL			
1220	LATO	REAL	PROFGE	1	LATOT	REAL			
1230	LLMECH	INTEGER	PROFGE	185	LONG	REAL			
20	LONGO	REAL	TRAJIN	2	LONGOT	REAL			
1221	LONGO	REAL	PROFGE	172	MODF	INTEGER	ARRAY	NAV	PROFGE
454	IPATH	INTEGER	ARRAY	1227	MSCGT	INTEGER			
31	HALF	REAL	OUTPUT	25	QALFOY	REAL			
213	ONY	REAL	NAV	214	QOV	REAL	ARRAY	NAV	OUTPUT
215	OP7	REAL	NAV	25	OFIA	REAL	ARRAY	NAV	OUTPUT
12	DETASY	REAL	OUTPUT	222	OFIL12	REAL	ARRAY	NAV	OUTPUT
176	OH8	REAL	NAV	27	OLAT	REAL			
24	OLAT9T	REAL	OUTPUT	32	OLONG	REAL			
25	OLONGT	REAL	OUTPUT	0	OTIME	REAL			
142	OV92P	REAL	NAV	515	PASC	REAL	ARRAY	NAV	PROFGE
1215	PHENDP	REAL	PROFGE	0	PI	REAL			
520	PTICH	REAL	PROFGE	5	PLAT14	REAL			
2	PTIME	REAL	CONTROL	1215	PPTICH	REAL			
6	PFIT	REAL	INPUTS	1	PTIME	REAL			
216	Q2P96	REAL	NAV	19	PAGOFQ	REAL			
0	RFSTO	REAL	IMUGAT	11	PFSD	REAL			
702	RSTAP	INTEGER	PROFGE	17	PHO	REAL	ARRAY	NAV	UNVPSL
1212	QOLRAT	REAL	PROFGE	3	POUND	INTEGER			
200	QOLR	REAL	UNVPSL	65	PSMAY	REAL			
7	QSTIME	REAL	CONTROL	7	PSOTI	REAL			
2	SALEQT	REAL	UNVPSL	76	SALE	REAL			
13	SF9T	REAL	TRAJIN	764	SEGLNT	REAL	ARRAY	NAV	PROFGE
0	SIMPIN	INTEGER	TRAJIN	15	SF9TP	REAL	ARRAY	NAV	TRAJIN
0	SCOPTH	INTEGER	SIMPIN	21	SLATOT	REAL			
51	SCYD	REAL	SCOPTH	62	SCXO	REAL			
3	STAPT	REAL	INPUTS	64	SSZO	REAL			
145	SCPHI	REAL	INPUTS	4	STOD	REAL			
53	THICOP	REAL	NAV	1245	TAGG	REAL	ARRAY	NAV	PROFGE
60	THITPO	REAL	NAV	55	THIPT	REAL	ARRAY	NAV	PROFGE
17	TIMEO	REAL	NAV	0	TIME	REAL			
13	TULJOK	REAL	TRAJIN	13543	TORAY	REAL			
1	TOUANT	REAL	INPUTS	4	TREXV	REAL			
1243	TSTART	REAL	INPUTS	42	TOSSTO	REAL	ARRAY	NAV	CONTROL
124	VOMP	REAL	PROFGE	1130	TIDM	INTEGER	ARRAY	NAV	TRAJIN
1244	VTO	REAL	NAV	2	VUANT	REAL			
107	V92	REAL	PROFGE	10	V9T	REAL	ARRAY	NAV	TRAJIN
40	V92T	REAL	NAV	11	V92P	REAL	ARRAY	NAV	NAV
12	WT	REAL	OUTPUT	7	W92T	REAL	ARRAY	NAV	UNVPSL
125	XCALF	REAL	NAV	65	W9V	REAL	ARRAY	NAV	NAV
124	XCALF	REAL	NAV	152	XH	REAL			
147	X92D	REAL	NAV	166	X92PHI	REAL			
			NAV	176	X99Q2P	REAL	ARRAY	NAV	NAV



COMMON BLOCKS	LENGTH
TRAJEN	21
SUPPH	1
SINPH	1
COSPH	1
ATNPH	1
PICIS	2
VPPTH	1
PROFSE	605

STATISTICS

PROGRAM LENGTH	12774	703
REFER LENGTH	12260	5295
C LABELD COMMON LENGTH	20518	1065



## C CONTROL DATA

60 C 003000

C 003010

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VARIABLES	SH	TYPE	RELOCATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	121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BLOCK DATA BLKDAT 74774 OPIED TRACE

COMMON	BLOCKS	LENGTH
TPAJTH	21	
UMVDEL	10	
SCRPTH	1	
SINPTH	1	
COSPTH	1	
AINPTH	1	
PCFCTS	2	
VPPTH	1	

STATISTICS

PROGRAM LENGTH	CB
CM LABELED COMMON LENGTH	6278 0 407

FIN 4.5120DE 05/25/76 17.24.45

PAGE

5





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115      1      " SEC TPAJ SAMO/NAV CYCLE ".I3." ATT CYCLE"/".
115      2      "NAV CYCLE ".I3)
      C
120      C      NORMAL PATH
      C
120      200 CONTINUE
      IF (INITIALS.E. 1) GO TO 245
      DO 240 I=1,14
125      240 READ(I) = P20(I)
      INIT = 2
      GO TO 253
125      245 READ(20) (P20AT(I),I=1,14)
      IF (EOP(20) .NE. 0) GO TO 300
130      250 SLAF91 = SIN(LAT91)
      CLAL11 = COS(LAT21)
      SALF91 = SIN(ALF91)
      CALF91 = COS(ALF91)
      RETURN
135      C      TAPE ERROR HANDLING
      C
135      300 YSTOP = 10
      WRITE (6,301)
140      301 FORMAT (2X,"***** INPUT TAPE READ ERROR: ERROR LEVEL 10**")
      RETURN
      END

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004010  
004020  
004030  
004040  
004050  
004060  
004070  
004080  
004090  
004100  
004110  
004120  
004130  
004140  
004150  
004160  
004170

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
1 INDEC

VARIABLES	SN	TYPE	RELOCATION	3	ALF91	REAL	TPAJIN
33 A	REAL	ARRAY	NAV	0	ALF91	REAL	TPAJIN
75 ALPHA	REAL	ARRAY	NAV	77	CALF	REAL	NAV
44 J	REAL	ARRAY	NAV	22	CLATCT	REAL	TPAJIN
24 CALF4T	REAL	TPAJIN	TPAJIN	11	CV72	REAL	TPAJIN
10 CV01	REAL	TPAJIN	TPAJIN	165	CV01	REAL	TPAJIN
12 CV01	REAL	TPAJIN	TPAJIN	154	CV01	REAL	TPAJIN
0 CCR92P	REAL	TPAJIN	TPAJIN	22	CCR92P	REAL	TPAJIN
177 CCR92P	REAL	TPAJIN	TPAJIN	190	CCR92P	REAL	TPAJIN
153 CCR92P	REAL	TPAJIN	TPAJIN	16	CCR92P	REAL	TPAJIN
123 CCR92P	REAL	TPAJIN	TPAJIN	213	CCR92P	REAL	TPAJIN
56 CCR92P	REAL	TPAJIN	TPAJIN	191	CCR92P	REAL	TPAJIN
14 CCR92P	REAL	TPAJIN	TPAJIN	112	CCR92P	REAL	TPAJIN
225 CCR92P	REAL	TPAJIN	TPAJIN	71	CCR92P	REAL	TPAJIN
74 CCR92P	REAL	TPAJIN	TPAJIN	4	CCR92P	REAL	TPAJIN
15 CCR92P	REAL	TPAJIN	TPAJIN	16	CCR92P	REAL	TPAJIN
137 CCR92P	REAL	TPAJIN	TPAJIN	665	CCR92P	REAL	TPAJIN
7 CCR92P	REAL	TPAJIN	TPAJIN	13	CCR92P	REAL	TPAJIN
22 CCR92P	REAL	TPAJIN	TPAJIN	243	CCR92P	REAL	TPAJIN

VARIABLES SH TYPE RELOCATION

21	INPUT	INTEGER	INPUTS	20	INCOO	INTEGER	INPUTS
5	INIT	INTEGER	CONTROL	51	IOEND	INTEGER	CONTROL
23	IPC	INTEGER	APRAY	6	ISTOP	INTEGER	CONTROL
447	ITIMP1	INTEGER		450	ITIMP2	INTEGER	
451	ITIMP3	INTEGER		452	ITIMP4	INTEGER	
454	ITIMP5	INTEGER		17	ITAIT	INTEGER	
47	ITPFI	INTEGER		16	ITPNAV	INTEGER	
105	LAT	REAL	INPUTS	1	LATOT	REAL	
106	LONG	REAL	NAV	21	LONGO	REAL	
2	LONGO1	REAL	TRAJIN	213	OOK	REAL	
214	OOV	REAL	NAV	215	OOV	REAL	
222	OTILR	REAL	NAV	175	OOV	REAL	
0	OTIME	REAL	ARRAY	142	ONAPP	REAL	
5	PLATIM	REAL	CONTROL	2	PLTIME	REAL	
455	PRC	REAL	INPUTS	3	PRCAT	REAL	
6	PRNT	REAL	APRAY	1	PRIME	REAL	
216	QPP95	REAL	NAV	12	PRC	REAL	
65	QSMAX	REAL	APRAY	12	PRC	REAL	
7	QSTRT	REAL	INPUTS	3	OSTIME	REAL	
23	SALCOT	REAL	INPUTS	75	SCALE	REAL	
21	SLATOT	REAL	TRAJIN	12	SPAT	REAL	
63	SVXO	REAL	TRAJIN	62	SSXO	REAL	
7	STAYT	REAL	INPUTS	64	SSZO	REAL	
145	S2PHI	REAL	INPUTS	4	STOP	REAL	
63	THTCOR	REAL	NAV	453	TMPO	REAL	
60	THTCRO	REAL	NAV	55	THTEFT	REAL	
0	TIME	REAL	APRAY	455	TIM	REAL	
12	TOLJOK	REAL	TRAJIN	17	TIMEO	REAL	
1	TOUANT	REAL	IMP S	4	TOFV	REAL	
2	TOUANT	REAL	IMP S	194	VOAO	REAL	
107	V42	REAL	NAV	10	VOY	REAL	
66	V4V	REAL	APRAY	11	VOY	REAL	
152	XH	REAL	APRAY	125	XSCALE	REAL	
146	X52CHT	REAL	NAV	124	XSCALE	REAL	
126	X0092P	REAL	NAV	147	XV92P	REAL	

FILE NAMES NONE  
TAPF20 UNFMT TAPF6 FMT

EXTERNALS TYPE AGGS  
GOS REAL 1 LIBRARY  
SH REAL 1 LIBRARY

INLINE FUNCTIONS TYPE AGGS  
400 INTEGER 2 INTRIN

STATEMENT LABELS

2	4	64	20	252	25	FMT
67	36	72	40	42	50	
224	55	FMT	45	50	70	
357	110	FMT	373	115	FMT	
146	200		0	260		
164	250		175	400		
127	400		124	420		
122	420		347	567		

05/25/75 17.26.46

FIN 4.542466

SUBROUTINE INDEC 74774 OPI=0 IPAGE

LOADS LABEL INDEX FROM-TO LENGTH PROPERTIES  
151 240 1 123 124 40 INSTACK

COMMON BLOCKS LENGTH  
CONTROL 9  
INPUTS 56  
HAY 132  
TRAJIR 21

STATISTICS  
PROGRAM LENGTH 4734 315  
COMMON LENGTH 4143 269

1-159





146

17.24.45

05/25/75

74/74 OPERA SPACE

VARIABLES IN TYPE RELOCATION  
12F 88020 05AL MAY

STATEMENT LABELS

1 50

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
21	10	1	39 42	17A	OPT
52	50	1	53 56	10B	OPT

COMMON	BLOCKS	LENGTH
NEW	192	
OUTSIDE	42	
UNFOLD	10	
FIELD	21	

STATISTICS  
PROGRAM LENGTH 849 52  
COMPILED COMPILE LENGTH 4029 261

```

1      SUBROUTINE PRINT2
2      C
3      C PRINTER OUTPUT SUBROUTINE
4      C
5      IMPLICIT REAL(A-H,L-7)
6      COMMON /CONTROL/ OTIME,
7      1 TYPEV, INIT,
8      2 COMMON /HAY/ CORDP(2,3), V2P(3),
9      3 CORDP(2,3), A(3,3),
10     4 THICOR(1,2), WY(3),
11     5 SALT, CALF,
12     6 LAF, LOG,
13     7 XSALF, YCALF,
14     8 S2PHI, X22PHI,
15     9 CORDP(2,3), CORDP(3,3), OTH,
16     10 ODX, ODY, OZ,
17     11 GAINS(3,10), IGAINP(3)
18     12 COMMON /OUTPUT/ IITILE(20),
19     13 OLAT, LONG,
20     14 V2T(2), QH,
21     15 OLONG, DOLF,
22     16 IPAGE, JPLIP,
23     17 COMMON /TRAJIN/ TIME,
24     18 H, FIAT(3),
25     19 TIMEG, LONG,
26     20 CALFOT, ANNUANT,
27     21 SLOP, PLOIN,
28     22 CVD2, CVD3,
29     23 ITRNAV, ITRAT,
30     24 ITC(30), IOPHP,
31     25 PSMA, PSMAV,
32     26 COMMON /UNV9SL/ OT,
33     27 EF,
34     28 PESO
35     29 IF (INIT .NE. 0) GO TO 1900
36     30 IPRINT = 100
37     31 PERIODIC PRINTOUT
38     32
39     33 1900 CONTINUE
40     34 IF (IPRINT .LT. IPLIM) GO TO 1910
41     35 WRITE(6,9100) IITILE(1), I=1, 20, IPAGE
42     36 IPRINT = 5
43     37 IPAGE = IPAGE + 1
44     38 1910 WRITE(6,9105) TIME
45     39 WRITE(6,9110) OLAT91, OLAT, OLAT,
46     40 WRITE(6,9115) OLONG91, OLONG, OLONG,
47     41 WRITE(6,9120) CALF91, DOLF, DOLF,
48     42 WRITE(6,9125) H, H, H,
49     43 WRITE(6,9130) V2T(1), V2T(2), V2T(3),
50     44 WRITE(6,9135) V2T(2), V2T(3), V2T(3),
51     45 WRITE(6,9140) FIAT(1), FIAT(2), FIAT(3),
52     46 WRITE(6,9145) OT(1), OT(2), OT(3),
53     47 WRITE(6,9150) OT(1), OT(2), OT(3),
54     48 WRITE(6,9155) OT(1), OT(2), OT(3),
55     49

```



VARIABLES	SN	TYPE	RELOCATION	14	HSOTIM	REAL	INPUTS
15 HSOINP	15	REAL	NAV	345	I	INTEGER	INPUTS
137 HV92P	137	REAL	ARRAY	345	I	INTEGER	CONTROL
7 TCMVYL	7	INTEGER	CONTROL	10	ICMCO	INTEGER	NAV
22 IEPLIM	22	INTEGER	INPUTS	263	IGAIN	INTEGER	INPUTS
21 IMUTYP	21	INTEGER	INPUTS	263	ICMCO	INTEGER	INPUTS
5 IMY	5	INTEGER	CONTROL	61	ICMCO	INTEGER	INPUTS
55 IPAGE	55	INTEGER	OUTPUT	24	IPC	INTEGER	INPUTS
55 IPLM	55	INTEGER	OUTPUT	57	IPDINT	INTEGER	OUTPUT
6 IXTOP	6	INTEGER	CONTROL	0	ITITLE	INTEGER	OUTPUT
27 IIRAIT	27	INTEGER	INPUTS	67	ITRFL	INTEGER	INPUTS
14 ITHAV	14	INTEGER	INPUTS	346	J	INTEGER	INPUTS
125 LAT	125	REAL	NAV	1	LAT9T	REAL	TRAJIN
106 LONG	106	REAL	NAV	20	LONG9	REAL	TRAJIN
26 OALF9T	26	REAL	TRAJIN	31	OALF	REAL	OUTPUT
214 OUY	214	REAL	NAV	213	ORX	REAL	NAV
35 OETA	35	REAL	ARRAY	213	ORZ	REAL	NAV
222 OFILIP	222	REAL	ARRAY	32	OFI9T	REAL	OUTPUT
27 OLAY	27	REAL	NAV	176	OH3	REAL	NAV
30 OLCNG	30	REAL	OUTPUT	24	OLAT9T	REAL	OUTPUT
0 OTIME	0	REAL	OUTPUT	25	OLH9T	REAL	OUTPUT
2 PI	2	REAL	CONTROL	142	ONV9T	REAL	NAV
2 PLTIME	2	REAL	CONTROL	5	PLATIM	REAL	INPUTS
1 PTIME	1	REAL	CONTROL	6	ONV9T	REAL	INPUTS
10 PAUPFP	10	REAL	CONTROL	216	OP995	REAL	NAV
17 QHO	17	REAL	UNVSL	11	QFS9	REAL	UNVSL
65 QSMAX	65	REAL	ARRAY	3	QFS9	REAL	UNVSL
7 RST9T	7	REAL	INPUTS	3	QSTIME	REAL	CONTROL
76 SALT	76	REAL	INPUTS	2	QJ	REAL	UNVSL
13 SF9T	13	REAL	NAV	24	SALF9T	REAL	TRAJIN
52 SSX9	52	REAL	TRAJIN	21	SLAT9T	REAL	TRAJIN
54 SSZ9	54	REAL	INPUTS	63	SSV9	REAL	INPUTS
4 STOP	4	REAL	INPUTS	3	STANT	REAL	INPUTS
67 THICOP	67	REAL	INPUTS	115	SSPHI	REAL	INPUTS
50 TH120	50	REAL	NAV	55	TH9T9T	REAL	NAV
17 TIME9	17	REAL	NAV	0	TIME	REAL	NAV
4 TIMEV	4	REAL	TRAJIN	13	TLJ9K	REAL	TRAJIN
104 V91P	104	REAL	CONTROL	1	TOUANT	REAL	INPUTS
10 V91	10	REAL	NAV	2	VQUANT	REAL	INPUTS
11 V92P	11	REAL	TRAJIN	107	V92	REAL	INPUTS
7 WFT	7	REAL	NAV	43	V92T	REAL	NAV
125 XCALF	125	REAL	UNVSL	55	W9V	REAL	UNVSL
124 XCALF	124	REAL	NAV	152	XH	REAL	NAV
147 XV92P	147	REAL	NAV	145	YSPHJ	REAL	NAV
			ARRAY	125	V99999	REAL	NAV

FILE NAMES: MODE  
TAPF6 FMT

## STATEMENT LABELS

1900	13	1910	ENT
104 2000	222	9109	FMT
242 9110	247	9115	FMT
261 9125	266	9120	FMT
273 9143	305	9145	FMT
277 9155	324	9160	FMT

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
45	1950	I	65 62	129	NOT INFO
46	1950	J	61 62	63	INSTACK
51		J	63 63	208	EXT DEFS NOT INFO
62		I	63 63	113	EXT DEFS

COMPON	BLOCKS	LENGTH
CONTROL		9
HAV		182
OUTPUT		48
IPAJIN		21
IMPUTS		56
UNVPSL		10

STATISTICS  
 PROGRAM LENGTH 3479 231  
 OR LABELED COM. ON LENGTH 5069 326



FIN 4.5P45C 05/25/76 17.24.46

SUBROUTINE BLIAP2 74774 OPI=0 IPAGE

VARIABLES	SU	TYPE	RELOCATION
7 ALF1	REAL	TRAJIN	24
22 CLAT91	REAL	TRAJIN	54
16 CLAT5	REAL	TRAJIN	47
43 CH	REAL	OUTPUT	52
53 CLONG	REAL	TRAJIN	44
51 FLAT91	REAL	TRAJIN	4
42 I	INTEGER	TRAJIN	7
12 ICWCP	INTEGER	CONTROL	5
55 IPAGE	INTEGER	OUTPUT	54
57 IPINT	INTEGER	OUTPUT	5
6 IITL5	INTEGER	OUTPUT	1
20 LONG9	REAL	TRAJIN	2
31 GOLF	REAL	TRAJIN	26
15 GFTA	REAL	TRAJIN	32
27 OLAT	REAL	TRAJIN	24
30 CLONG	REAL	TRAJIN	25
0 OIMF	REAL	CONTROL	2
1 OIME	REAL	CONTROL	3
21 SLAT91	REAL	TRAJIN	13
21 SLAT91	REAL	TRAJIN	0
17 TIMFO	REAL	TRAJIN	4
13 VIT	REAL	TRAJIN	43

FILE NAMES	MODE	UNFMT	TAPE6	FMT
1-167				

STATEMENT LABELS

5 10

0 90

INACTIVE

33

91

FMT

COMMON BLOCKS LENGTH

CONTROL 9

OUTPUT 48

TRAJIN 21

STATISTICS

PROGRAM LENGTH

COMMON LENGTH

COMMON LENGTH

COMMON LENGTH

COMMON LENGTH

COMMON LENGTH

COMMON LENGTH

COMMON LENGTH

COMMON LENGTH

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COMMON LENGTH

COMMON LENGTH





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60 TO 810
  2 WRITE(5,120) (EIA99(I), I=1,4)
  120 FORMAT (5X,*,*,*,*, (4(2X,G16,10)))
  GO TO 810
  3 WRITE(6,130) (OV92P(I), I=1,3)
  130 FORMAT (5X,*,*,*,*, OV92P, (3(2X,G16,10)))
  GO TO 810
  4 WRITE(6,140) (OV92P(I), I=1,3)
  140 FORMAT (5X,*,*,*,*, OV92P, (3(2X,G16,10)))
  GO TO 810
  5 WRITE(6,150) (PH0(I), I=1,3)
  150 FORMAT (5X,*,*,*,*, PH0, (3(2X,G16,10)))
  GO TO 810
  6 WRITE(6,160) (COP92P(K,I), I=1,3), (K=1,3)
  160 FORMAT (18X, (3(2X,G16,10)), 5X,*,*,*, COP92P, (3(2X,G16,10)))
  18X, (3(2X,G16,10))
  GO TO 810
  7 WRITE(6,180) (THIER1(I), I=1,3)
  180 FORMAT (5X,*,*,*,*, THIER1, (3(2X,G16,10)))
  GO TO 810
  9 WRITE(6,190) (THIT90(I), I=1,3)
  190 FORMAT (5X,*,*,*,*, THIT90, (3(2X,G16,10)))
  GO TO 810
  10 WRITE(6,200) (UNV(I), I=1,3)
  200 FORMAT (5X,*,*,*,*, UNV, (3(2X,G16,10)))
  GO TO 810
  11 WRITE(6,210) (VDM0, (3(2X,G16,10)))
  210 FORMAT (5X,*,*,*,*, VDM0, (3(2X,G16,10)))
  GO TO 810
  12 WRITE(6,220) (G92P(I), I=1,3)
  220 FORMAT (5X,*,*,*,*, G92P, (3(2X,G16,10)))
  GO TO 810
  13 WRITE(6,230) A(1,2), A(2,3), A(3,4)
  230 FORMAT (5X,*,*,*,*, MISALICH, (3(2X,G16,10)))
  GO TO 810
  14 WRITE(6,240) (C192P(K,I), I=1,3), (K=1,3)
  240 FORMAT (18X, (3(2X,G16,10)), 5X,*,*,*, C192P, (3(2X,G16,10)))
  18X, (3(2X,G16,10))
  GO TO 810
  15 WRITE(6,250) (C2895(K,I), I=1,3), (K=1,3)
  250 FORMAT (18X, (3(2X,G16,10)), 5X,*,*,*, C2895, (3(2X,G16,10)))
  18X, (3(2X,G16,10))
  GO TO 810
  16 WRITE(6,260) (C095(K,I), I=1,3), (K=1,3)
  260 FORMAT (18X, (3(2X,G16,10)), 5X,*,*,*, C095, (3(2X,G16,10)))
  18X, (3(2X,G16,10))
  GO TO 810
  17 WRITE(6,270) TIME
  270 FORMAT (5X,*,*,*,*, TIME, (3X,G16,10))
  GO TO 810
  18 CALL MFM(TMPARR,C095,C2895)
  18X, (3(2X,G16,10))
  19 WRITE(6,280) (TMPARR(I,2), I=1,3), (I=1,3), (I=1,3)
  280 FORMAT (5X,*,*,*,*, INC ANGLE, (3(2X,G16,10)))
  GO TO 810
  19 WRITE(6,290) (C2895(I), I=1,4)
  290 FORMAT (5X,*,*,*,*, C2895, (3(2X,G16,10)))
  GO TO 810
```

```

115      GO TO 809
      807 IPRINI = IPRINI + 1
      808 IPRINI = IPRINI + 1
      809 IPRINI = IPRINI + 1
      810 IPRINI = IPRINI + 2
      20 CONTINUE
      21 CONTINUE
      22 CONTINUE
      23 CONTINUE
      24 CONTINUE
      25 CONTINUE
      26 CONTINUE
      27 CONTINUE
      28 CONTINUE
      29 CONTINUE
      30 CONTINUE
      RETURN
      END
039180
039190
039200
039210
039220
039230
039240
039250
039260
039270
039280
039290
039300
039310
039320
039330
039340
039350

```

CARD NO. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

51 I THERE IS NO PATH TO THIS STATEMENT.

1-170

SYMBOLIC REFERENCE MAP (P=1)

ENTRY POINTS

VARIABLES	SV	TYPE	RELOCATION	3	ALFQI	REAL	102AY	TPAJIN
31 A	REAL	ARRAY	NAV	0	ALFQI	REAL	102AY	TPAJIN
75 ALPHA	REAL	ARRAY	NAV	44	R	REAL	102AY	TPAJIN
100 APOSTO	REAL	ARRAY	TPAJIN	24	ALFQI	REAL	102AY	TPAJIN
77 GALE	REAL	NAV	TPAJIN	10	CV01	REAL	102AY	TPAJIN
22 CLAT9T	REAL	TPAJIN	TPAJIN	12	CV03	REAL	102AY	TPAJIN
11 CV02	REAL	TPAJIN	TPAJIN	5	CV02P	REAL	102AY	TPAJIN
14 CV090	REAL	TPAJIN	TPAJIN	177	CV05	REAL	102AY	TPAJIN
154 CV01R	REAL	TPAJIN	TPAJIN	56	CV02P	REAL	102AY	TPAJIN
45 CV090	REAL	TPAJIN	TPAJIN	57	CV02P	REAL	102AY	TPAJIN
23 CV03S	REAL	TPAJIN	TPAJIN	22	CV04C	REAL	102AY	TPAJIN
31 COMTS	REAL	TPAJIN	TPAJIN	153	CV04C	REAL	102AY	TPAJIN
54 DOLF	REAL	TPAJIN	TPAJIN	123	CV04C	REAL	102AY	TPAJIN
105 DELT	REAL	TPAJIN	TPAJIN	47	CV04C	REAL	102AY	TPAJIN
16 DELTS	REAL	TPAJIN	TPAJIN	53	CV04C	REAL	102AY	TPAJIN
42 DH	REAL	TPAJIN	TPAJIN	219	CV04C	REAL	102AY	TPAJIN
52 DLOWC	REAL	TPAJIN	TPAJIN	14	CV04C	REAL	102AY	TPAJIN
44 DV	REAL	TPAJIN	TPAJIN	5	CV04C	REAL	102AY	TPAJIN
3 DV90	REAL	TPAJIN	TPAJIN	191	CV04C	REAL	102AY	TPAJIN
4 EF	REAL	TPAJIN	TPAJIN	5	CV04C	REAL	102AY	TPAJIN
5 FSU	REAL	TPAJIN	TPAJIN	5	CV04C	REAL	102AY	TPAJIN
6 FTA9P	REAL	TPAJIN	TPAJIN	5	CV04C	REAL	102AY	TPAJIN



FILE NAMES  
TAPE6

MODE  
FMT

EXTERNALS  
HTM

TYPE  
365

STATEMENT LABELS

62 1	65 2	70 3
71 4	76 5	171 6
122 8	125 9	130 10
133 11	136 12	141 13
144 14	165 15	208 16
227 17	232 18	240 19
253 23	263 21	263 22
253 23	253 24	263 25
253 26	253 27	263 28
253 29	253 30	14 31
123 100	316 117	327 122
149 130	351 140	362 150
375 160	411 180	422 190
433 200	444 210	456 220
470 230	503 240	521 250
537 260	553 270	566 280
577 290	587 290	265 308
247 309	251 310	266 309

INACTIVE

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
124	* K	71 71	149		FMT DEFS NOT INNER
105	* I	71 71	113		FMT DEFS
147	* K	93 93	148		FMT DEFS NOT INNER
150	* I	93 93	119		FMT DEFS
172	* K	97 97	149		FMT DEFS NOT INNER
171	* I	97 97	119		FMT DEFS
211	* K	101 101	148		FMT DEFS NOT INNER
212	* I	131 131	113		FMT DEFS

COMMON BLOCKS

BLOCK	LENGTH
CONTRL	9
INUNAT	67
INPUTS	56
NAV	182
OUTPUT	48
PGRAV	7
TRAJIN	21
UNVPSL	10

STATISTICS

PROGRAM LENGTH	6179	309
CM LAIFED COMMON LENGTH	6209	400



```

      GO TO 170
      167 DV9P(I)=SE9P(I)+2.*SF9T(I)
      GO TO 170
      165 DV9P(I)=DV9P(I)+4.*SE9I(I)
      170 SF9P(I)=SF9T(I)
      GO TO 100
      C
      C GRAPEZDICAL RULE IF NUMBER OF INTERVALS IS 000
      C
      61 DO 50 I=1,3
      DV9P(I) = DV9P(I) + (SF9T(I) + SF9P(I))/2.0*DELTS
      50 SF9P(I) = SF9T(I)
      QUANTIZE THE VELOCITY OUTPUTS
      C
      C
      C
      100 ICMCYP=ICMCYP+1
      IF (ICMCYP.LE.ICHCYL) RETURN
      ICMCYP=1
      DO 54 I=1,3
      V9P(I) = DV9P(I) + RESID(I)
      64 RESID(I) = DV9P(I)
      CALL ONFIZ(V9P(I),VQUANT)
      DO 55 I=1,3
      66 RESID(I) = RESID(I) - DV9P(I)
      70 RETURN
      END
  
```

1-174

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
1 CHINIC

VARIABLES	SN.	TYPE	RELOCATION	3	ALF9T	REAL	TRAJM
75 A	REAL	APRAY	NAV	0	0	REAL	INPUTS
76 ALPHA	REAL	APRAY	NAV	44	B	REAL	NAV
101 APT310	REAL	APRAY	IMUDAT	44	CALF9T	REAL	TRAJIN
77 CALF	REAL	APRAY	NAV	24	0	REAL	INPUTS
21 CLAT9T	REAL	APRAY	IPAJIN	10	CV01	REAL	INPUTS
11 CV02	REAL	APRAY	INPUTS	12	CV03	REAL	INPUTS
165 CDP90	REAL	APRAY	NAV	0	C0920	REAL	NAV.
154 CDP910	REAL	APRAY	NAV	177	C095	REAL	NAV
45 C1090	REAL	APRAY	IMUDAT	56	C1020	REAL	IMUDAT
20 CDP95	REAL	APRAY	IMUDAT	67	C090T	REAL	IMUDAT
31 COMIS	REAL	APRAY	IMUDAT	22	C0910	REAL	NAV
153 DELTA	REAL	APRAY	NAV	103	DELTA	REAL	NAV
123 DELTA	REAL	APRAY	NAV	16	DELTA	REAL	TRAJIN
55 DELTMAX	REAL	APRAY	INPUTS	211	DELTA	REAL	NAV
7 DV9P	REAL	APRAY	IMUDAT	14	DV920	REAL	NAV
6 F	REAL	APRAY	IMUDAT	6	F	REAL	IMUDAT
6 F50	REAL	APRAY	IMUDAT	191	F50	REAL	IMUDAT
6 ITAY9	REAL	APRAY	IMUDAT	5	ITAYT	REAL	IMUDAT
112 FILATT	REAL	APRAY	NAV	235	CAT9C	REAL	NAV





FTN 4.5+7436. 05/25/75 17.24.66

SUBROUTINE CHINIC 74774 OPER TRACE

LOOPS	LABEL	INDEX	E20H-10	LENGTH	PROPERTIES	EVI REFS
3	55	I	39 46	149		
22	170	I	51 62	248	OPT	
63	50	I	67 69	110	OPT	
77	64	I	77 79	63	INSTACK	
113	66	I	81 82	43	INSTACK	

COMMON BLOCKS	LENGTH
CONTROL	9
THUDAY	67
INPUTS	56
HAV	182
UNVPSL	10
TRAJIN	21

STATISTICS

PROGRAM LENGTH	1538	107
CH LABELED COMMON LENGTH	5319	345

```

1      SUBROUTINE IORCOP(A092P,AV92P)
      IMPLICIT REAL(A-H,L-Z)
      DIMENSION A092P(3,3),AV92P(3)
      COMMON ZINPUSZ, AQUANT, TQUANT,
1      SIOP, PLOTIM, PNT,
2      CVDZ, CVDZ, TOLJOK,
3      ITCAT, INCOP,
4      IPC130, IOPNLP, SSX3,
5      RSMAX, QPSMAX, ITFFIL
10     COMMON ZANVZ, CUP92P(3,3),V92P(3),
1      CUP90(3,3), A(3,3),
2      THICOP(3), MAX(3),
3      SALF, CALF,
4      LAT, LONG,
5      XSALF, XCALF,
6      XS2PHI, XS2PHI,
7      CUP90(3,3), CUP90(3,3), OH3,
8      ODX, ODY,
9      GAIN(3,10),TGAINP(3)
20     COMMON /UNIVERSL/ PI,
1      PI,
2      DESG
      TORQ == GENERATE EARTH ANGLE TOPPING ANGLES
      GO 580 I=1,3
      VTHET(1)=A092P(1,1)*WFOI*REL7
580  THIRQ(1)=VTHET(1)*PHC(1)*DEL7
      IF (IPC10) GO TO 620
      CALL DOUT(9)
      GO 620 CONTINUE
      IF (IPC19) GO TO 700
      CALL DOUT(9)
      GO 700 CONTINUE
      GOPLS == SENSED ACCELERATION DUE TO ANGULAR VELOCITIES
      GO 710 I=1,3
      THICOP(I) = THET(I) + THIRQ(I)
      A(2,1) = -THICOP(1)
      A(3,1) = THICOP(2)
      A(3,2) = -THICOP(1)
      A(1,2) = THICOP(3)
      A(1,3) = -THICOP(2)
      A(2,3) = THICOP(1)
      CALL VAVEC(44V,A,AV92P)
      IF (IPC10) GO TO A00
      CALL DOUT(10)
      GO 900
      END

```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS

VARIABLES	SN	TYPE	DECLARATION	75	ALPHA	REAL	ARRAY	NAV	F.P.
11 A	REAL	ARRAY	NAV	0	AV92P	REAL	ARRAY	NAV	F.P.
12 ANUMT	REAL	ARRAY	NAV	44	R	REAL	ARRAY	NAV	F.P.
13 AV92P	REAL	ARRAY	NAV	10	CV91	REAL	ARRAY	NAV	F.P.
14 CVD2	REAL	ARRAY	NAV	12	CV12	REAL	ARRAY	NAV	F.P.
15 CVD90	REAL	ARRAY	NAV	0	CV92P	REAL	ARRAY	NAV	F.P.
16 CVD910	REAL	ARRAY	NAV	177	CA15	REAL	ARRAY	NAV	F.P.
17 CVD910	REAL	ARRAY	NAV	153	DFLM	REAL	ARRAY	NAV	F.P.
18 CVD910	REAL	ARRAY	NAV	133	FL1A	REAL	ARRAY	NAV	F.P.
19 CVD910	REAL	ARRAY	NAV	210	CV92P	REAL	ARRAY	NAV	F.P.
20 CVD910	REAL	ARRAY	NAV	4	FF	REAL	ARRAY	NAV	F.P.
21 CVD910	REAL	ARRAY	NAV	5	FF	REAL	ARRAY	NAV	F.P.
22 CVD910	REAL	ARRAY	NAV	112	FLATT	REAL	ARRAY	NAV	F.P.
23 CVD910	REAL	ARRAY	NAV	71	G2P	REAL	ARRAY	NAV	F.P.
24 CVD910	REAL	ARRAY	NAV	14	HPI	REAL	ARRAY	NAV	F.P.
25 CVD910	REAL	ARRAY	NAV	122	I	REAL	ARRAY	NAV	F.P.
26 CVD910	REAL	ARRAY	NAV	253	ICATNP	REAL	ARRAY	NAV	F.P.
27 CVD910	REAL	ARRAY	NAV	23	ICATNP	REAL	ARRAY	NAV	F.P.
28 CVD910	REAL	ARRAY	NAV	23	ICATNP	REAL	ARRAY	NAV	F.P.
29 CVD910	REAL	ARRAY	NAV	67	ITFIL	REAL	ARRAY	NAV	F.P.
30 CVD910	REAL	ARRAY	NAV	102	LAT	REAL	ARRAY	NAV	F.P.
31 CVD910	REAL	ARRAY	NAV	213	OX	REAL	ARRAY	NAV	F.P.
32 CVD910	REAL	ARRAY	NAV	215	OX	REAL	ARRAY	NAV	F.P.
33 CVD910	REAL	ARRAY	NAV	175	OX	REAL	ARRAY	NAV	F.P.
34 CVD910	REAL	ARRAY	NAV	6	OX	REAL	ARRAY	NAV	F.P.
35 CVD910	REAL	ARRAY	NAV	10	OX	REAL	ARRAY	NAV	F.P.
36 CVD910	REAL	ARRAY	NAV	17	OX	REAL	ARRAY	NAV	F.P.
37 CVD910	REAL	ARRAY	NAV	65	OX	REAL	ARRAY	NAV	F.P.
38 CVD910	REAL	ARRAY	NAV	2	OX	REAL	ARRAY	NAV	F.P.
39 CVD910	REAL	ARRAY	NAV	62	OX	REAL	ARRAY	NAV	F.P.
40 CVD910	REAL	ARRAY	NAV	64	OX	REAL	ARRAY	NAV	F.P.
41 CVD910	REAL	ARRAY	NAV	4	OX	REAL	ARRAY	NAV	F.P.
42 CVD910	REAL	ARRAY	NAV	63	OX	REAL	ARRAY	NAV	F.P.
43 CVD910	REAL	ARRAY	NAV	60	OX	REAL	ARRAY	NAV	F.P.
44 CVD910	REAL	ARRAY	NAV	1	OX	REAL	ARRAY	NAV	F.P.
45 CVD910	REAL	ARRAY	NAV	2	OX	REAL	ARRAY	NAV	F.P.
46 CVD910	REAL	ARRAY	NAV	11	OX	REAL	ARRAY	NAV	F.P.
47 CVD910	REAL	ARRAY	NAV	65	OX	REAL	ARRAY	NAV	F.P.
48 CVD910	REAL	ARRAY	NAV	152	OX	REAL	ARRAY	NAV	F.P.
49 CVD910	REAL	ARRAY	NAV	146	OX	REAL	ARRAY	NAV	F.P.
50 CVD910	REAL	ARRAY	NAV	126	OX	REAL	ARRAY	NAV	F.P.

35 700

63 800

STATISTICS LAPFLS

1

SUBROUTINE LORCOR 74/74 OPT=0 IPAGE 3

FIN 4.5+3406 05/25/76 17.24.40

LOOPS LABEL INDEX FROM-TO LENGTH PROPERTIES  
 16 580 7 26 28 129 OPT  
 36 710 1 18 40 68 INSTACK

COMMON BLOCKS LENGTH  
 INPUTS 56  
 NAV 182  
 UNVRSI 10

STATISTICS

PROCESS LENGTH 1028 7  
 CALLED COMMON LENGTH 3703 248







05/05/76 17.26.46

FTN 4.543.06

SUBROUTINE INRNAV 7474 OPTED IRACE

VARIABLES	SN	TYPE	RELOCATION	4	FF	REAL	UNVSCL	UNVSCL	UNVSCL
14 OV92P	REAL	ARRAY	NAV	4	FF	REAL	UNVSCL	UNVSCL	UNVSCL
6 EFRR0	REAL	ARRAY	UNVSCL	5	FF	REAL	UNVSCL	UNVSCL	UNVSCL
101 FTA	REAL	ARRAY	NAV	6	FF	REAL	UNVSCL	UNVSCL	UNVSCL
5 E1A9I	REAL	ARRAY	IRAJI	112	FF	REAL	UNVSCL	UNVSCL	UNVSCL
225 GAINS	REAL	ARRAY	NAV	3	GLHSC	REAL	UNVSCL	UNVSCL	UNVSCL
1 G4LNT	REAL	PGRAV	PGRAV	4	G04	REAL	PGRAV	PGRAV	PGRAV
6 G4MS2	REAL	PGRAV	PGRAV	5	G04	REAL	PGRAV	PGRAV	PGRAV
2 G4S2	REAL	PGRAV	PGRAV	3	G04	REAL	PGRAV	PGRAV	PGRAV
71 G4P2P	REAL	PGRAV	NAV	74	H	REAL	PGRAV	PGRAV	PGRAV
4 HE	REAL	IRAJI	IRAJI	1	H01	REAL	IRAJI	IRAJI	IRAJI
15 H0JING	REAL	INPUTS	INPUTS	14	H0JING	REAL	INPUTS	INPUTS	INPUTS
137 H0J2P	REAL	ARRAY	NAV	165	I	REAL	ARRAY	ARRAY	ARRAY
7 ICMCYL	INTEGER	CONTROL	CONTROL	10	ICMCYP	INTEGER	CONTROL	CONTROL	CONTROL
22 ICMCLIM	INTEGER	INPUTS	INPUTS	263	ICMCLIM	INTEGER	INPUTS	INPUTS	INPUTS
21 ICMUTYP	INTEGER	INPUTS	INPUTS	23	ICMUTYP	INTEGER	INPUTS	INPUTS	INPUTS
5 ICMIT	INTEGER	CONTROL	CONTROL	61	ICMILP	INTEGER	CONTROL	CONTROL	CONTROL
21 ICM	INTEGER	ARRAY	INPUTS	6	ICM	INTEGER	ARRAY	ARRAY	ARRAY
17 ICMATT	INTEGER	INPUTS	INPUTS	57	ICMATT	INTEGER	INPUTS	INPUTS	INPUTS
14 ICMNAV	INTEGER	INPUTS	INPUTS	372	J	INTEGER	INPUTS	INPUTS	INPUTS
105 LAT	REAL	NAV	NAV	1	LAT9I	REAL	NAV	NAV	NAV
106 LONG	REAL	NAV	NAV	29	LONGA	REAL	NAV	NAV	NAV
2 LONG9I	REAL	IRAJI	IRAJI	213	CON	REAL	IRAJI	IRAJI	IRAJI
214 OVY	REAL	NAV	NAV	215	CON	REAL	NAV	NAV	NAV
222 OFILIR	REAL	ARRAY	NAV	176	CON	REAL	ARRAY	ARRAY	ARRAY
171 QMFM	REAL	NAV	NAV	0	QTIME	REAL	NAV	NAV	NAV
142 OV92P	REAL	ARRAY	NAV	2	TIME	REAL	ARRAY	ARRAY	ARRAY
5 PLOTIM	REAL	INPUTS	INPUTS	2	TIME	REAL	INPUTS	INPUTS	INPUTS
6 P0T1	REAL	INPUTS	INPUTS	1	I	REAL	INPUTS	INPUTS	INPUTS
214 P2P05	REAL	ARRAY	NAV	10	QPE	REAL	ARRAY	ARRAY	ARRAY
2 RESID	REAL	ARRAY	INPUTS	11	QPE	REAL	ARRAY	ARRAY	ARRAY
17 QHO	REAL	ARRAY	NAV	3	QPE	REAL	ARRAY	ARRAY	ARRAY
65 QSHAX	REAL	INPUTS	INPUTS	3	QPE	REAL	INPUTS	INPUTS	INPUTS
7 QST0I	REAL	INPUTS	INPUTS	2	QPE	REAL	INPUTS	INPUTS	INPUTS
76 SALF	REAL	NAV	NAV	23	SALF9I	REAL	NAV	NAV	NAV
14 SF9I	REAL	ARRAY	IRAJI	15	SALF9I	REAL	ARRAY	ARRAY	ARRAY
21 SLAT9I	REAL	IRAJI	IRAJI	62	SXK	REAL	IRAJI	IRAJI	IRAJI
61 SSV0	REAL	INPUTS	INPUTS	64	SXK	REAL	INPUTS	INPUTS	INPUTS
3 ST0I	REAL	INPUTS	INPUTS	4	SXK	REAL	INPUTS	INPUTS	INPUTS
145 S2PHI	REAL	NAV	NAV	63	ST0I	REAL	NAV	NAV	NAV
55 INTERI	REAL	NAV	NAV	60	THTCR	REAL	NAV	NAV	NAV
0 TIME	REAL	NAV	NAV	47	THTCR	REAL	NAV	NAV	NAV
13 TOLJPK	REAL	IRAJI	IRAJI	4	TIME	REAL	IRAJI	IRAJI	IRAJI
1 TOUTANT	REAL	INPUTS	INPUTS	42	TIME	REAL	INPUTS	INPUTS	INPUTS
104 V0MP	REAL	NAV	NAV	2	V0JANT	REAL	NAV	NAV	NAV
17 V9I	REAL	ARRAY	IRAJI	107	V9I	REAL	ARRAY	ARRAY	ARRAY
11 V92P	REAL	NAV	NAV	7	V9I	REAL	NAV	NAV	NAV
12 W	REAL	NAV	NAV	66	W	REAL	NAV	NAV	NAV
125 XCALF	REAL	NAV	NAV	152	W	REAL	NAV	NAV	NAV
173 XHB	REAL	NAV	NAV	124	XCALF	REAL	NAV	NAV	NAV
145 X52PHI	REAL	NAV	NAV	147	X52PHI	REAL	NAV	NAV	NAV
126 X0P9P	REAL	NAV	NAV	147	X0P9P	REAL	NAV	NAV	NAV

1183

VARIABLES	TYPE	APGS
APCAL?	REAL	5
AVUT	REAL	1
IP	REAL	3
IP	REAL	0



STATEMENT LABELS

0	100	INACTIVE	0	110	13	300
0	305	INACTIVE	0	310	20	315
47	320		52	400	0	410
107	422		113	422	115	430
120	490		143	520	153	522
155	500		0	600	170	505
0	810	INACTIVE	200	815	217	920
225	900		241	1600		

LOOPS LABEL INDEX FROM-TO LENGTH PROPERTIES

3	110	I	41	43	EN	INSTACK
14	310	I	50	53	12R	OPT
35	315	I	60	62	12R	OPT
110	520	* I	95	100	20R	NOT INNER
111	520	J	96	100	15R	OPT

COMMON BLOCKS LENGTH

CONTROL	9
INPUTS	67
MAV	56
PCRAV	182
TRAJIN	7
UNVPSL	

STATISTICS

PROGRAM LENGTH	3743	252
CM LABELD COMMON LENGTH	5400	352

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1      C      SUBROUTINE POSVEL
      C
      C      ROUTINE TO CALCULATE THE AIRCRAFT POSITION AND VELOCITY
      C      IN THE LVN FRAME (2 SPACE+ DEN AXES). POSITION CONSIST- OF
      C      LATITUDE, LONGITUDE, AND WINDING ANGLE.
      C
10     C
      C      IMPLICIT REAL(A-H,I-Z)
      C      COMMON /TRAJIN/ TIME, LATIT, LONGIT, ALF91,
      C      H3, ETAGT(3), SF91(3),
      C      TIME, LONGO, CLAT91, DELTS,
      C      CALF91,
      C
15     C
      C      COMMON /NAV/ COP92P(3,3), V92P(3),
      C      C92H0(3,3), A(3,3), Q(3,3), INTERI(3),
      C      THICOP(3), MXV(3), G92P(3), H, ALPHA,
      C      SALF, CALF, DELT, V04F,
      C      LAT, LONG, V92(3), FILATI(3,3), CLIA,
      C      XSALF, YCALF, X1092P(3,3), W92P(3),
      C      S2PHI, X52PHI, X92P(3), X4,
      C      C92J(3,3), C92P0(3,3), QH3, C925(3,3),
      C      ODX, ODY, QOZ, C2P05(4), OFILP(3),
      C      GAINSL2, DEL, IGAINP(3)
      C
20     C
      C      FIND THE POSITION ANGLES
      C
      C      TEMP = SQRT(COP92P(1,1)**2+COP92P(2,1)**2)
      C      LAT = ATAN2(COP92P(3,1),TEMP)
      C      CALPHA=0
      C      IF (TEMP.EQ. 0.) GO TO 1200
      C      LONG = ATAN2(COP92P(2,1),COP92P(1,1))
      C      LONG = LONG + LONGO
      C      ALPHA = ATAN2(-COP92P(3,2),COP92P(2,2))
      C      CALPHA=(LAT-PA+CALPHA)/2
      C
25     C
      C      CONVERT VELOCITIES TO LVN FRAME
      C
      C      1200 SALF = SIN(ALPHA)
      C      CALF = COS(ALPHA)
      C      XSALF=SALF+CALPHA*CALF
      C      YCALF=CALF-CALPHA*SALF
      C      V92(1) = V92P(1)
      C      V92(2) = CALF*V92P(2) + SALF*V92P(3)
      C      V92(3) = -SALF*V92P(2) + CALF*V92P(3)
      C      RETURN
      C      END

```

SYMBOLIC REFERENCE MAP (S=1)

CHIEF POINTS  
1 POSVEL

05/25/75 17.24.46

FIR 4.5+7406

SUBROUTINE COSVEL 74774 OPER=0 TRACE

VARIABLES	SN	TYPE	RELOCATION						
13 A		REAL	ARRAY	NAV	3	ALF9T	REAL		TRAJIN
75 ALPHA		REAL	NAV	NAV	44	2	REAL		NAV
77 CALF		REAL	NAV	NAV	24	CALFOT	REAL		TRAJIN
22 CLAT9T		REAL	TRAJIN	TRAJIN	165	COP9C	REAL		NAV
0 COP92P		REAL	NAV	NAV	154	C3110	REAL		NAV
177 C095		REAL	AS2AY	NAV	22	C09HC	REAL		NAV
74 DAPHA		REAL	NAV	NAV	153	DELH	REAL		NAV
109 DELT		REAL	NAV	NAV	123	DELTA	REAL		NAV
16 DELT		REAL	TRAJIN	TRAJIN	213	DELTA	REAL		NAV
14 DV92P		REAL	NAV	NAV	101	ETA	REAL		NAV
5 ET9T		REAL	ARRAY	NAV	112	ETLAT	REAL		NAV
226 GAINS		REAL	ARRAY	NAV	71	S000	REAL		NAV
74 H		REAL	NAV	NAV	1	H0	REAL		TRAJIN
137 HV92P		REAL	ARRAY	NAV	253	ICATIN	INTEGER		NAV
195 LAT		REAL	NAV	NAV	1	LAT9T	REAL		TRAJIN
195 LONG		REAL	NAV	NAV	20	LONG0	REAL		TRAJIN
2 LONG9T		REAL	TRAJIN	TRAJIN	75	DALPHA	REAL		NAV
213 OXY		REAL	NAV	NAV	214	OXY	REAL		NAV
216 OZ		REAL	NAV	NAV	222	DELTP	REAL		NAV
176 OHC		REAL	NAV	NAV	142	OZ92P	REAL		NAV
216 OZ95		REAL	NAV	NAV	17	OZ95	REAL		NAV
75 SALT		REAL	NAV	NAV	23	SALT9T	REAL		TRAJIN
13 SF9T		REAL	ARRAY	NAV	21	SLAT9T	REAL		TRAJIN
145 S2PH2		REAL	NAV	NAV	73	TEMP	REAL		NAV
63 THIG02		REAL	ARRAY	NAV	55	THIC0T	REAL		NAV
63 THIG02		REAL	ARRAY	NAV	3	TIME	REAL		NAV
17 TIME0		REAL	TRAJIN	TRAJIN	104	VOMP	REAL		NAV
10 VOT		REAL	TRAJIN	TRAJIN	137	V02	REAL		NAV
11 V02P		REAL	NAV	NAV	66	WXY	REAL		NAV
125 XCALF		REAL	NAV	NAV	152	XH	REAL		NAV
124 XSALF		REAL	NAV	NAV	146	XSC0HT	REAL		NAV
147 XV92P		REAL	ARRAY	NAV	126	X092P	REAL		NAV

EXTENDALS	TYPE	APPS							
ATAN2	REAL	2	LIBRARY						
SIN	REAL	1	LIBRARY						

STATEMENT LABELS  
27 1200COMMON BLOCKS LENGTH  
IPAJIN 21  
NAV 182STATISTICS  
PROGRAM LENGTH 769 52  
COMMON BLOCKS LENGTH 3138 203

1-187

AVAG 3  
SALING POINTS

VAR/ANGLES	SN	TYPE	LOCATION				
73 A	REAL	ARRAY	NAV	0	AM	REAL	F.P.
75 ALPHA	REAL	NAV	NAV	0	AS2PHI	REAL	F.P.
76 ANP92P	REAL	ARRAY	F.P.	44	P	REAL	NAV
77 CALF	REAL	NAV	NAV	33	CONF	REAL	NAV
155 COP90	REAL	ARRAY	NAV	0	COP92P	REAL	NAV
154 C0910	REAL	ARRAY	NAV	17	C095	REAL	NAV
22 C9PH0	REAL	ARRAY	NAV	153	FLH	REAL	NAV
192 OFLT	REAL	NAV	NAV	123	OFLTA	REAL	NAV
210 OV502P	REAL	ARRAY	NAV	14	OV50P	REAL	NAV
191 FTA	REAL	ARRAY	NAV	112	FILFTT	REAL	NAV
225 GAINS	REAL	ARRAY	NAV	7	GLHSC	REAL	NAV
1 GPCHT	REAL	PGNAV	PGNAV	4	GM	REAL	NAV
5 GHS2	REAL	PGNAV	PGNAV	5	GM2	REAL	NAV
2 GPC	REAL	PGNAV	PGNAV	3	GM4	REAL	NAV
71 GP2P	REAL	NAV	NAV	74	H	REAL	NAV
117 HV92P	REAL	ARRAY	NAV	253	IGAINP	INTERG0	NAV

VARIABLES	SN	TYPE	RELOCATION
105 LAT	REAL	NAV	
213 ONY	REAL	NAV	
215 OJ7	REAL	NAV	
176 ONP	REAL	NAV	
216 Q2P95	REAL	APPAY	
74 SALE	REAL	NAV	
67 THTCOS	REAL	APPAY	
69 THTT90	REAL	APPAY	
107 VS2	REAL	APPAY	
66 WXY	REAL	APPAY	
152 XH	REAL	NAV	
146 X2PHI	REAL	NAV	
126 XCP92P	REAL	APPAY	
176 LONG	REAL	NAV	
214 ONY	REAL	NAV	
222 OFILTR	REAL	APPAY	
142 OV92P	REAL	APPAY	
17 PHO	REAL	APPAY	
145 SP2PHI	REAL	APPAY	
55 THTCST	REAL	APPAY	
134 V92P	REAL	APPAY	
11 V92P	REAL	APPAY	
125 XCALF	REAL	APPAY	
124 X5ALF	REAL	APPAY	
147 XV92P	REAL	APPAY	

COMMON BLOCKS LENGTH  
 NAV 182  
 PG-NAV 7

STATISTICS  
 PROGRAM LENGTH 343 28  
 C4 LABELED COMMON LENGTH 2759 189



FIN 4.5+24.25 05/25/76 17.24.46

SUBROUTINE ANGVLS 74/74 OPI=0 IPAGE

VARIABLES	SM	TYPE	RELOCATION						
*1 G92P	REAL	ARRAY	NAV	74	H	74	REAL	NAV	
1 MPI	REAL	UNVPSL	NAV	137	HV32P	137	REAL	NAV	
203 IGATNP	INTEGER	APRAY	NAV	185	LAT	185	REAL	NAV	
116 LONG	REAL	NAV	NAV	213	ONX	213	REAL	NAV	
214 ONY	REAL	NAV	NAV	215	ONZ	215	REAL	NAV	
222 OFILTP	REAL	ARRAY	NAV	175	OH3	175	REAL	NAV	
142 OV92P	REAL	APRAY	NAV	3	PT	3	REAL	NAV	
216 Q2P05	REAL	ARRAY	NAV	10	PAPER	10	REAL	NAV	
118 QFS0	REAL	UNVPSL	NAV	17	P40	17	REAL	NAV	
60 QM	REAL	NAV	NAV	57	DP	57	REAL	NAV	
7 PCT	REAL	UNVPSL	NAV	2	P9	2	REAL	NAV	
76 SALE	REAL	NAV	NAV	145	S20HI	145	REAL	NAV	
81 THICOP	REAL	ARRAY	NAV	55	THTEPT	55	REAL	NAV	
60 THTRQ	REAL	ARRAY	NAV	55	T401	55	REAL	NAV	
58 IMP2	REAL	NAV	NAV	104	V04P	104	REAL	NAV	
53 VE	REAL	NAV	NAV	3	VLCIV	3	REAL	NAV	
54 VM	REAL	NAV	NAV	107	V02	107	REAL	NAV	
11 V92P	REAL	ARRAY	NAV	51	W	51	REAL	NAV	
7 UERT	REAL	UNVPSL	NAV	52	W	52	REAL	NAV	
68 WVV	REAL	ARRAY	NAV	125	XCALF	125	REAL	NAV	
152 XH	REAL	NAV	NAV	124	XSCALE	124	REAL	NAV	
146 X22PHI	REAL	NAV	NAV	147	XV32P	147	REAL	NAV	
126 X0P92P	REAL	ARRAY	NAV						

FUNCTIONALS TYPE ARCS  
SQRT REAL 1. LIBRARY

COMMON BLOCKS LENGTH  
NAV 182  
UNVPSL 10

STATISTICS  
PROGRAM LENGTH 639 51  
CM LAYFED COMMON LENGTH 3003 192





VARIABLES	SN	TYPE	RELUCATION	6	FTAGP	REAL	APPAY	IMUDAT
101 ETA	REAL	ARRAY	NAV	225	GAINS	REAL	APPAY	IMUDAT
112 FILATT	REAL	ARRAY	NAV	74	M	REAL	APPAY	NAV
71 GOSP	REAL	ARRAY	NAV	14	HSOJIM	REAL		IMUDAT
15 HESING	REAL	ARRAY	IMUDAT	22	REALTY	REAL		IMUDAT
147 HVSZP	REAL	ARRAY	NAV	21	IMUTYP	REAL		IMUDAT
263 IGATNP	INTEGER	ARRAY	NAV	61	ICMPL	INTEGER		IMUDAT
20 INOCOR	INTEGER	ARRAY	IMUDAT	17	ITRATT	INTEGER		IMUDAT
27 IIC	INTEGER	ARRAY	IMUDAT	16	ITRATT	INTEGER		IMUDAT
67 IIPFIL	INTEGER	ARRAY	IMUDAT	105	LONG	INTEGER		IMUDAT
105 LAT	REAL	NAV	NAV	214	NAV	REAL		IMUDAT
213 ODX	REAL	NAV	NAV	222	OFILTR	REAL		IMUDAT
215 ODX	REAL	NAV	NAV	142	OVJPO	REAL		IMUDAT
176 ODX	REAL	NAV	NAV	6	POUT	REAL		IMUDAT
5 PLOTIM	REAL	ARRAY	IMUDAT	3	PSJIC	REAL		IMUDAT
216 QDQ95	REAL	ARRAY	NAV	55	PSMAX	REAL		IMUDAT
17 RHO	REAL	ARRAY	NAV	76	SELF	REAL		IMUDAT
7 S10P	REAL	NAV	IMUDAT	62	SVV1	REAL		IMUDAT
15 SF3TP	REAL	ARRAY	IMUDAT	64	SVZP	REAL		IMUDAT
47 SSVN	REAL	NAV	IMUDAT	4	STOP	REAL		IMUDAT
7 STAPT	REAL	NAV	IMUDAT	63	INTERQ	REAL		IMUDAT
145 S2PHI	REAL	NAV	NAV	53	INTERQ	REAL		IMUDAT
146 THERT	REAL	NAV	NAV	1	QUANT	REAL		IMUDAT
13 TOLJQK	REAL	NAV	IMUDAT	104	VNUP	REAL		IMUDAT
42 TPC5IN	REAL	APPAY	IMUDAT	107	VN2	REAL		IMUDAT
2 VDHANT	REAL	NAV	IMUDAT	12	WT	REAL		IMUDAT
11 V42P	REAL	APPAY	NAV	23	X	REAL		IMUDAT
66 WNV	REAL	APPAY	NAV	152	YH	REAL		IMUDAT
126 XCALF	REAL	NAV	NAV	146	XCPHMI	REAL		IMUDAT
124 XSELF	REAL	NAV	NAV	126	XCPHMI	REAL		IMUDAT
147 VV92P	REAL	APPAY	NAV			REAL		IMUDAT

EXTERNALS	ATAN2	TYPE	ARGS	2	LIBRARY
ATAN2	REAL				LIBRARY

COMMON BLOCKS	LENGTH
INPUTS	56
IMUDAT	67
NAV	182

STATISTICS	PROGRAM LENGTH	159	29
CM LALCFO COMMON LENGTH	4619	305	

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1      SUBROUTINE ININI
2      C
3      C THIS ROUTINE PERFORMS MUCH OF THE INITIALIZATION OF THE
4      C NAV SIMULATOR. THE RESULT IS PERFORMED BY THE EXEC AND INIC.
5      C
6      C
7      C
8      C
9      C
10     C
11     C
12     C
13     C
14     C
15     C
16     C
17     C
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VARIABLES	SH	TYPE	RELOCATION	10	RADDER	REAL	UNVSL
212 D2P05	REAL	ARRAY	IMUDAT	11	PES0	REAL	UNVSL
10 DHO	REAL	ARRAY	NAV	3	000	REAL	UNVSL
55 D5VAX	REAL		INPUTS	3	PSTIME	REAL	CONTRL
7 ASPT	REAL		INPUTS	2	10	REAL	UNVSL
76 SALS	REAL		NAV	23	SALF9T	REAL	UNVSL
11 SF9T	REAL	ARRAY	TRAJIN	15	SE9T	REAL	IMUDAT
21 SLAT9T	REAL		TRAJIN	62	SS9T	REAL	INPUTS
67 SSV0	REAL		INPUTS	54	SSZ0	REAL	INPUTS
11 S1PT	REAL		INPUTS	4	STOP	REAL	INPUTS
145 SP9T	REAL		NAV	63	TUT00T	REAL	ARRAY
55 TMTPT	REAL	ARRAY	NAV	60	TUT00T	REAL	ARRAY
9 TIME	REAL		TRAJIN	17	TUT00T	REAL	TRAJIN
17 TOLJAP	REAL		INPUTS	4	TUT00T	REAL	CONTRL
1 TOUTANT	REAL		INPUTS	42	TUT00T	REAL	TRAJIN
106 V00P	REAL		NAV	2	VQUANT	REAL	INPUTS
10 V01	REAL	ARRAY	TRAJIN	107	V02	REAL	NAV
11 V02P	REAL	ARRAY	NAV	7	H02T	REAL	UNVSL
12 WY	REAL	ARRAY	IMUDAT	45	V0V	REAL	NAV
125 X0ALE	REAL		NAV	152	M4	REAL	NAV
124 X0ALF	REAL		NAV	146	Y000PT	REAL	NAV
147 X002P	REAL	ARRAY	NAV	126	X0002P	REAL	NAV

FUNCTIONALS	TYPE	ARGS	REAL	1	TRAPCY
AMPUL2		5		1	
NDCHUPD		3		1	
GRAY		1		1	
OPTVX		7		1	
TOPCOP		2		1	

STATEMENT LABELS	72	410	75	450	0	520
	30	522	161	550	175	600

LOCAL LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
174 520	1	86 89	138	NOT INNER
176 520	3	87 89	100	OPT

COMMON BLOCKS	LENGTH
CONTROL	9
IMUDAT	57
INPUTS	56
NAV	182
POPAV	7
TRAJIN	21
UNVSL	10

STATISTICS	1528	234
PROGRAM LENGTH	1528	234
CY LABELD COMMON LENGTH	5400	352

```

SUBROUTINE ATFIL
C
C THIS ROUTINE IS A MULTIPLE FIXED GAIN FILTER THAT Y
C TO THE ALTITUDE DATA, ATTITUDE AND INS. PITCH AND SEC
C OPERATIVES AND THE STATE VARIABLES
C
C IMPLICIT REAL*8 (A-H,I)
COMMON /AINPUTS/ AOUNT,
1 STOP,
2 CPO2,
3 ITCAL,
4 ITCAL,
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DISCARD FIRST AND SECOND DERIVATIVES  
400 IGAINTLJIEK  
OFTLTPJIEK  
00 900 FILL  
900 FILL(C)JIEK+GAINSIT(K)\*FILLR(J)  
C UPDATE STATE VECTOR  
RETURN  
END

SYMBOLIC REFERENCE MAP (P=1)

ENTRY POINTS

1 ATTEL

VARIABLES	SN	TYPE	PELOCATION	75	ALPHA	REAL	ARRAY	NAV	INPUTS
77 A	0	ACQUANT	REAL	44	H	REAL			NAV
77 XALF	0	REAL	REAL	44	H	REAL			NAV
11 CV02	0	REAL	REAL	12	CV01	REAL			INPUTS
165 CIP93	0	REAL	REAL	12	CV02	REAL			INPUTS
194 C0910	0	REAL	REAL	177	C092P	REAL			NAV
22 C9PHO	0	REAL	REAL	177	C095	REAL			NAV
172 DELT	0	REAL	REAL	153	DELH	REAL			NAV
66 D99MAX	0	REAL	REAL	173	DELH	REAL			NAV
104 DT02	0	REAL	REAL	173	DELH	REAL			NAV
14 DV92P	0	REAL	REAL	210	CV592P	REAL			NAV
112 FLATT	0	REAL	REAL	131	FLA	REAL			NAV
225 GAINS	0	REAL	REAL	110	FLTP	REAL			NAV
74 H	0	REAL	REAL	71	G02P	REAL			NAV
14 H501M	0	REAL	REAL	15	H01M	REAL			NAV
177 I	0	INTEGER	INTEGER	137	H032P	REAL			NAV
22 INCOR	0	INTEGER	INTEGER	22	I0114	INTEGER			INPUTS
23 INCOR	0	INTEGER	INTEGER	21	I0114P	INTEGER			INPUTS
67 ITPFIL	0	INTEGER	INTEGER	61	I004LP	INTEGER			INPUTS
105 J	0	INTEGER	INTEGER	17	I104TT	INTEGER			INPUTS
105 LAT	0	REAL	REAL	16	I10NAV	INTEGER			INPUTS
213 ONX	0	REAL	REAL	105	K	INTEGER			NAV
215 U02	0	REAL	REAL	106	LONG	REAL			NAV
176 QH0	0	REAL	REAL	214	NAV	REAL			NAV
5 PLOTIM	0	REAL	REAL	222	OFTLTP	REAL			NAV
215 QCP95	0	REAL	REAL	142	OV92P	REAL			NAV
65 QSHAX	0	REAL	REAL	6	POIT	REAL			NAV
76 SALT	0	REAL	REAL	17	PHO	REAL			NAV
67 SSV0	0	REAL	REAL	7	PSTPT	REAL			NAV
145 SPMI	0	REAL	REAL	62	SCX0	REAL			NAV
55 TWCOT	0	REAL	REAL	64	SS70	REAL			NAV
13 TOLJPK	0	REAL	REAL	4	STOP	REAL			NAV
194 VIMP	0	REAL	REAL	61	THICOR	REAL			NAV
66 VV	0	REAL	REAL	50	TU120	REAL			NAV
152 XH	0	REAL	REAL	1	V01ANT	REAL			NAV
				11	V02P	REAL			NAV
				125	XCALF	REAL			NAV
				124	YCALF	REAL			NAV

SUBROUTINE ATECH  
 VARIABLES SN TYPE RELOCATION  
 164 XSPHY REAL NAV  
 126 XOP92P REAL ARRAY NAV  
 147 X092P REAL 400AY NAV

INLINE FUNCTIONS TYPE ARGS  
 ANS REAL 1 INTRIN

STATEMENT LABELS  
 50 308 62 400 0 903

LOOPS LABEL INDEX FROM-TO LENGTH PROPERTIES  
 11 900 J 95 62 718 NOT INTRIN  
 57 902 I 61 62 108 NOT INTRIN

COMMON BLOCKS LENGTH  
 INPUTS 56  
 NAV 182

STATISTICS  
 PROGRAM LENGTH 1139 75  
 COMMON LENGTH 3569 238



```

1      SUBROUTINE CPTHO(ARRAY)
      C
      C THIS ROUTINE CPTHONORMALIZES IS INPUT
      C
      IMPLICIT REAL*8 (A-H), REAL*4 (I-N)
      DIMENSION ARRAY(3,3), A(3,3), B(3,3)
      CALL MTHA(ARRAY,ARRAY)
      DO 525 I=1,3
      525 A(I,I) = A(I,I) - 1.0
      CALL MTHA(ARRAY,ARRAY)
      DO 530 I=1,3
      530 ARRAY(I,J) = ARRAY(I,J) - C.5*B(I,J)
      RETURN
      END
15

```

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
? OPTHO

VARIABLES	SN	TYPE	RELOCATION	0	ARRAY	REAL	INTEGER	ARRAY	F.P.
61 A		REAL	ARRAY						
72 B		REAL	ARRAY						
60 J		INTEGER		57	1				

EXTENSIONALS	TYPE	ARGS	MTM
4M		3	

STATEMENT LABELS

0	525	0	530	PROPERTIES
LOOPS LABEL	INDEX	FROM-TO	LENGTH	
21 525	I	8 9	50	INSTACK
72 530	J	11 13	120	NOT INFO
73 530	J	12 13	70	INSTACK

STATISTICS

PROGRAM LENGTH	1050	69
----------------	------	----



FIN 4.5+R4 05 05/25/75 17.24.65

SUBROUTINE DCMURP 74774 OPT=0 TRACE

015113  
015123  
005130  
005140  
015150  
015160  
015170  
015180  
015190  
015200

DCM(1,2)=DCM(1,2)+SOL\*DX-T3  
DCM(1,1)=DCM(1,1)+SOL\*DX-T2  
DCM(1,3)=DCM(1,3)+SOL\*DX-T2  
DCM(2,1)=DCM(2,1)+SOL\*DX-T1  
DCM(2,2)=DCM(2,2)+SOL\*DX-T1  
510 DD=DX  
DDY=DX  
DDZ=DX  
RETURN  
END

CARD NR. SEVERITY DETAILS DIAGNOSIS OF PROBLEM

56 I CONSTANT TOO LONG. HIGH ORDER DIGITS RETAINED, BUT SOME PRECISION LOST.

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
3 DCMURP

VARIABLES	SN	TYPE	RELOCATION	0	OTAC	REAL	F.P.
0 DCH	REAL	ARRAY	F.P.	0	OV	REAL	F.P.
0 DX	REAL		F.P.	0	TOOHP1	INTEGER	F.P.
0 DZ	REAL		F.P.	0	OV	REAL	F.P.
0 DDH	REAL		F.P.	162	SCL	REAL	F.P.
0 DDZ	REAL		F.P.	155	SO	REAL	F.P.
154 S1	REAL			157	T1	REAL	
156 S3	REAL			161	T2	REAL	
160 T2	REAL					REAL	

STATEMENT LABELS  
0 500 INACTIVE 143 510STATISTICS  
PROGRAM LENGTH 1630 185

```

1 SUBROUTINE QNTIZ(ARRAY,UNIT)
2
3   THIS SUBROUTINE PERFORMS THE QUANTIZATION FUNCTION.
4   IT CAUSES ITS INPUTS TO BE TRUNCATED TO THE NEAREST INTEGRAL
5   MULTIPLE OF A UNIT.
6   A UNIT OF 2520 IS INTERPRETED TO MEAN NO QUANTIZATION.
7
8   IMPLICIT REAL*8 (A-H,I-Z)
9   DIMENSION ARRAY(1)
10  IF (UNIT.EQ.0.1) RETURN
11  DO 10 I=1,3
12    ARRAY(I)=UNIT*FLOAT(ARRAY(I)/UNIT)
13  RETURN
14  END

```

SYMBOLIC REFERENCE MAP (R511)

ENTRY POINTS  
QNTIZ

VARIABLES	SN	TYPE	RELOCATION
0 ARRAY	REAL	ARRAY	F.P.
0 UNIT	REAL	25 I	INTEGER

THEIR FUNCTIONS	TYPE	ARGS	INT.	INTEGER	1	INTOIN
0 FLOAT	REAL	1	INIRIN			

STATEMENT LABELS  
9 10

LOOPS LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
20 10	I	11 12	58	INSTACK

STATISTICS  
PROGRAM LENGTH 338 27



015577  
015578  
015579  
015580  
015581  
015582  
015583  
015584  
015585  
015586  
015587  
015588  
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015591  
015592  
015593  
015594  
015595  
015596  
015597  
015598  
015599  
015600

SUBROUTINE TO MULTIPLY A MATRIX BY A TRANSPOSED MATRIX

FORM IS

DO = RECC

BY = MATRIX TO BE TRANSPOSED BEFORE MULTIPLYING

IMPLICIT REAL(A-M,L-2)

COMMON A(1:3),B(1:3),C(1:3),D(1:3)

DO 10 J=1,3

DO 10 K=1,3

A(I,J) = 0.0

DO 10 K=1,3

10 A(I,J) = A(I,J) + B(K,I)\*C(K,J)

DO 12 J=1,3

DO 12 K=1,3

12 D(I,J) = A(I,J)

RETURN

END

SYMBOLIC REFERENCE MAP (P.1)

ENTRY POINTS

1 MIN

VARIABLES	SN	TYPE	RELOCATION	REAL	ARRAY	F.P.	REAL	ARRAY	F.P.
56 A									
0 CC									
51 I									
55 K									

STATEMENT LABELS

0 10

0 12

LOOP'S LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
16 10	* I	17 21	228	NOT INVER
17 10	* J	18 21	178	NOT INVER
24 10	K	20 21	108	OPT
41 12	* I	22 24	118	NOT INVER
42 12	J	23 24	68	INSTACK

STATISTICS

PROGRAM LENGTH

758

61



```

1      SUBROUTINE ROTXYZ(ARRAY,SZ,CX,CY,CX,CY,CX,CX)
      C THIS ROUTINE FORMS THE ROTATION MATRIX THAT ACTS ON AN X-Y-Z
      C COLUMN VECTOR AS SPECIFIED BY THREE EULER ROTATIONS. FIRST
      C ROTATION IS MINUS Z DEGREES ABOUT Z, THEN MINUS Y ABOUT Y,
      C THEN X DEGREES ABOUT X. THE INPUTS ARE THE SINES AND COSINES OF
      C 7-Y, AND X-DEGREES. THE RESULT IS STORED IN ARRAY.
      C
      C IMPLICIT REAL*8(A-H,L-Z)
      DIMENSION ARRAY(3,3)
      SYCZ = SY*CZ
      SYCZ = SY*SZ
      ARRAY(1,1) = CX*CZ
      ARRAY(2,1) = CX*SZ - SY*SYCZ
      ARRAY(3,1) = -SX*SZ - CX*SYCZ
      ARRAY(1,2) = -CX*SZ
      ARRAY(2,2) = CX*CZ + SX*SYCZ
      ARRAY(3,2) = -SX*CZ + CX*SYCZ
      ARRAY(1,3) = SY
      ARRAY(2,3) = SX*CY
      ARRAY(3,3) = CX*CY
      RETURN
      END

```

## SYMBOLIC REFERENCE MAP (P=1)

## ENTRY POINTS

3 ROTXYZ

VARIABLES	SN	TYPE	RELOCATION	F.P.	F.P.
0 ARRAY	REAL	ARRAY	F.P.	REAL	F.P.
0 CY	REAL		F.P.	REAL	F.P.
0 SX	REAL		F.P.	REAL	F.P.
51 SYCZ	REAL			52 SYCZ	REAL
0 SZ	REAL				F.P.

## STATISTICS

PROGRAM LENGTH

523

43



SUBSEQUENTINE MATR44 74/74 OPI=0 IPACE

SUBROUTINE MATPAN(B,A)  
IMPLICIT REAL(A-H), REAL(L-Z)

NOVEMBER 3 1931 - 013.31

**SYMPOSIUM: JOURNAL OF PREVENTIVE MAP (P=11)**

# ENTRY POINTS

VAR/TABLES	SN	TYPE	RELOCATION
0 A	REAL	ARRAY	F.P.

# STATISTICS

0161390  
0161380  
0161370  
0161360  
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0161320  
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0161290  
0161280  
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0161220  
0161210  
0161200  
0161190  
0161180  
0161170  
0161160  
0161150  
0161140  
0161130  
0161120  
0161110  
0161100  
0161090  
0161080  
0161070  
0161060  
0161050  
0161040  
0161030  
0161020  
0161010  
0161000

05/25/75 17.24.40

FIN 4.5+R436

SUBROUTINE ROTZYX 74724 OPT=0 IPAGE

```

1      SUBROUTINE ROTZYX(IPRAY,SZ,C7,SY,CY, SX,CX)
2      C THIS ROUTINE FORMS THE ROTATION MATRIX THAT ACTS ON AN X-Y-Z
3      VECTOR. THE ROTATION IS SPECIFIED BY THREE EULER ANGLES. FIRST
5      ROTATION IS ABOUT X, NEXT ABOUT Y, THEN ABOUT Z. THE INPUTS
6      ARE THE SINES AND COSINES OF THE ROTATIONS ANGLES. THE OUTPUT IS
7      IN ARRAY
8
9      IMPLICIT REAL(A-H,I-Z)
10     DIMENSION ARRAY(1,3)
11     SYSX=SY*SX
12     CYCX=CY*CX
13     ARRAY(1,1)=CY*C7
14     ARRAY(1,2)=SZ*CY
15     ARRAY(1,3)=SY
16     ARRAY(2,1)=SYSX*C7+SZ*CX
17     ARRAY(2,2)=SYSX*S7+SZ*CX
18     ARRAY(2,3)=SY*SX
19     ARRAY(3,1)=C7*SYCX+S7*SX
20     ARRAY(3,2)=SZ*SYCX+SX*CZ
21     ARRAY(3,3)=CY*CX
22     RETURN
23     END

```

## SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS

3 ROTZYX

VARIABLES	SN	TYPE	RELOCATION	
0 IPRAY		REAL	ARRAY	F.P.
0 CY		REAL		F.P.
0 SX		REAL		F.P.
52 SYCX		REAL		F.P.
0 SZ		REAL		F.P.
			0 CX	REAL
			0 C7	REAL
			0 SY	REAL
			51 SYSX	REAL

## STATISTICS

PROGRAM LENGTH

538

41

```

1      C      SUBROUTINE SSATUD
2      C      THIS ROUTINE GENERATES THAT GYRAL ANGLES THAT WOULD BE GENERATED
3      C      BY A PERFECT SPIN STABLE IMU. THE ANGLES ARE ROTATIONS
4      C      ABOUT Z-X-Y, AND Z (IN THAT ORDER) FROM THE BODY IN
5      C      TOWARDS THE IMU.
6      C
7      IMPLICIT REAL(8-H), DEC(1-Z)
8      COMMON /IMUDAT/ RPTIO(3), OV9P(3), FTAGP(4), WT(3),
9      C      1 SERI(2,3), R2P3(1,3), C945(1,3), PRESIO(3), C100(3,3),
10     C      2 C102P(1,3), C2P95(1,3), ARS3(1,3),
11     C      COMMON /HVAZ/ C92P(7,3), V52P(1,3),
12     C      1 C94P(1,3), A(3,3), 8(1,3),
13     C      2 THICOP(1,3), WXP(3), G92P(1,3), H, ALHUA,
14     C      3 SALT, CALF, DELI,
15     C      4 LAL, LOHC, V52(3), ELATT(3,3), DCLTA,
16     C      5 YSALF, XCALF, XOP2P(1,3), HV92P(3), OV32P(3),
17     C      6 S2PHI, X52PHI, XV32P(1,3), VH,
18     C      7 C925(1,3), CUP90(1,3), OH3, C995(1,3), OV592P(3),
19     C      8 QDY, ADY, OH2, C995(4), OFILTR(3),
20     C      9 GAINS(1,10), TGAIMP(3)
21     C      COMMON /HYVESL/ PI,
22     C      1 EF, FSO,
23     C      2 RESD,
24     C      COMMON /TRAJIN/ TIME,
25     C      1 H2, ETAGT(3), LATY, LONG9T, ALF9T,
26     C      2 TIME2, LONG2, SLAT9T, SE9T(3), DELTS,
27     C      3 GALE9T, SLAT9T, CLAT9T, SALF9T,
28     C      COMMON /INPUTS/ QUANT,
29     C      1 STOP, PLOTIM, F9NT, QUANT, SIANT,
30     C      2 CUP2, CUP3, TOLJPK, RS9T, CVD1,
31     C      3 ITPHAW, ITPAFT, IN92P, HS9TIM,
32     C      4 PSMA, IOPVLP, SSXP, ITPFL, SS90,
33     C      EQUIVALENCE (TH1,ETAGP(1)), (TH2,ETAGP(2)), (TH3,ETAGP(3)),
34     C      1 TH4,ETAGP(4),
35     C      CALL POIXYZ(C2P95, SIN(ETAGT(1)), COS(ETAGT(1)), SIN(ETAGT(2)),
36     C      1 COS(ETAGT(2)), SIN(ETAGT(3)), COS(ETAGT(3)),
37     C      CALL M71A,C102P,C2P95)
38     C      1 TH2=TH4
39     C      1 TH1=TH1
40     C      TEMPE=502*(1.0E0-A(1,3)**2)
41     C      IF (TEMP.EC.0.E0) GO TO 5
42     C      TH2=ATAN2(A(1,3),A(3,2))
43     C      TH3=ATAN2(TEMP,A(3,3))
44     C      1 TH1=ATAN2(A(1,3),A(1,2))
45     C      5 TH2=TH2-TH1
46     C      1 TH1=TH1-TH1
47     C      IF (TH2.GT. MPI .AND. TH1.GT. MPI) GO TO 1
48     C      GO TO 2
49     C      2 TH2=TH2+PI
50     C      1 TH2=TH1
51     C      1 TH1=TH1+PI
52     C      2 CONTINUE
53     C      TH1=TH1-5*MPI
54     C      CALL O7112(ETAGP,QUANT)
55     C      C100(4)=ETAGP(2)

```

017140  
017170  
017180  
017190

ETA9P(1)=0.  
IF (IPC121) ME. 01 CALL OUT(2)  
SETUP  
END

60

SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS  
1 SSATUR

VARIABLES	SM	TYPE	AFLOCATION	1	ALF91	REAL	TRAJIN
23 A	REAL	APRAY	NAV	0	ADJUNT	REAL	TRAJIN
75 ALPHA	REAL	NAV	NAV	44	D	REAL	TRAJIN
100 ARTSID	REAL	APRAY	INUDAT	24	CALF9T	REAL	TRAJIN
77 CALF	REAL	NAV	NAV	10	CV01	REAL	TRAJIN
22 CLAT9T	REAL	TRAJIN	TRAJIN	12	CV03	REAL	TRAJIN
11 CVP2	REAL	INPUTS	INPUTS	0	C292R	REAL	TRAJIN
155 C2920	REAL	APRAY	NAV	177	C295	REAL	TRAJIN
154 C2920	REAL	APRAY	NAV	55	C1092P	REAL	TRAJIN
45 C1090	REAL	APRAY	INUDAT	67	C295T	REAL	TRAJIN
20 C2945	REAL	APRAY	INUDAT	22	C29HD	REAL	TRAJIN
31 C2945	REAL	APRAY	INUDAT	107	DEL1	REAL	TRAJIN
151 DELM	REAL	NAV	NAV	15	DEL1S	REAL	TRAJIN
123 DELTA	REAL	NAV	NAV	164	DT41	REAL	TRAJIN
66 DSHAX	REAL	INPUTS	INPUTS	210	DV592P	REAL	TRAJIN
163 DTH2	REAL	APRAY	INUDAT	14	DV320	REAL	TRAJIN
4 DV4P	REAL	APRAY	UNVSL	5	EP0P0	REAL	TRAJIN
4 EF	REAL	UNVSL	UNVSL	101	FT1	REAL	TRAJIN
5 ESO	REAL	UNVSL	UNVSL	5	ETADY	REAL	TRAJIN
5 ETADP	REAL	APRAY	UNVSL	225	GATUS	REAL	TRAJIN
112 FILATT	REAL	APRAY	NAV	74	H	REAL	TRAJIN
71 G22P	REAL	APRAY	NAV	14	HPT	REAL	TRAJIN
4 H2	REAL	TRAJIN	TRAJIN	22	ITLIM	REAL	TRAJIN
15 H201C	REAL	INPUTS	INPUTS	21	IMUTYP	REAL	TRAJIN
137 H22P	REAL	APRAY	INPUTS	61	IP0P0	REAL	TRAJIN
261 IGATNP	INTEG	APRAY	NAV	17	ITRATT	INTEG	TRAJIN
20 INCOR	INTEG	APRAY	NAV	16	ITRNAV	INTEG	TRAJIN
24 IPC	INTEG	APRAY	INPUTS	1	LAT9T	REAL	TRAJIN
67 ITRFIL	INTEG	NAV	NAV	20	LONGO	REAL	TRAJIN
105 LAT	REAL	NAV	NAV	213	COX	REAL	TRAJIN
106 LONG	REAL	NAV	NAV	215	002	REAL	TRAJIN
214 LONGT	REAL	TRAJIN	TRAJIN	176	OH2	REAL	TRAJIN
214 00V	REAL	NAV	NAV	160	OH2	REAL	TRAJIN
222 01LTR	REAL	APRAY	NAV	0	PI	REAL	TRAJIN
161 01M1	REAL	NAV	NAV	6	PNT	REAL	TRAJIN
142 0V92P	REAL	APRAY	INPUTS	19	PAPER	REAL	TRAJIN
5 PLOTIN	REAL	APRAY	NAV	11	PFSH	REAL	TRAJIN
216 22P95	REAL	APRAY	INUDAT	3	P23	REAL	TRAJIN
0 2FSD	REAL	APRAY	NAV	7	P510	REAL	TRAJIN
17 2HO	REAL	APRAY	INPUTS	76	SALE	REAL	TRAJIN
64 2SMAX	REAL	UNVSL	UNVSL	13	SEAT	REAL	TRAJIN
2 21	REAL	UNVSL	UNVSL				
21 2ALF9T	REAL	TRAJIN	TRAJIN				



```

1  SUBROUTINE SSINTG
2  C THIS ROUTINE TRANSFORMS THE VELOCITY INCREMENTS FROM
3  C THE HANDED AZIMUTH FRAME TO THE SPACE STABLE FRAME
4  C
5  C
6  C
7  C
8  C
9  C
10 C
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SYMBOLIC PRESENCE MAP (P=1)

EMPTY POINTS

1 SSINTG

VARIABLES	SH	TYPE	RELOCATION	1	ALERT	REAL	TOUCH
75 ALPHA	REAL	NAV	NAV	0	ADJUST	REAL	INPUTS

VARIABLES	SN	TYPE	RELOCATION	ARRAY	REAL	44	R	REAL	APRAY	NAV
100	APESIN	REAL	IMUDAT	NAV	REAL	44	0	CALF9T	APRAY	NAV
77	CALF	REAL	IMUDAT	NAV	REAL	24	24	CALF9T	APRAY	NAV
22	GLAT9T	REAL	TRAJIN	NAV	REAL	10	10	CV01	APRAY	NAV
11	CV02	REAL	IMUDAT	NAV	REAL	12	12	CV03	APRAY	NAV
154	CV090	REAL	APRAY	NAV	REAL	0	0	CV092P	APRAY	NAV
154	CV090	REAL	APRAY	NAV	REAL	177	177	CV095	APRAY	NAV
45	CV090	REAL	APRAY	NAV	REAL	55	55	CV192P	APRAY	NAV
20	CV095	REAL	IMUDAT	NAV	REAL	67	67	CV095T	APRAY	NAV
11	CV095	REAL	IMUDAT	NAV	REAL	22	22	CV095C	APRAY	NAV
153	CV19	REAL	NAV	NAV	REAL	107	107	CV19T	APRAY	NAV
127	CV19T	REAL	NAV	NAV	REAL	16	16	CV19T	APRAY	NAV
56	CV19T	REAL	IMUDAT	NAV	REAL	210	210	CV192P	APRAY	NAV
3	CV19P	REAL	IMUDAT	NAV	REAL	14	14	CV192P	APRAY	NAV
4	FF	REAL	IMUDAT	NAV	REAL	6	6	FF000	APRAY	NAV
5	FF	REAL	IMUDAT	NAV	REAL	101	101	FFA	APRAY	NAV
6	FFA	REAL	IMUDAT	NAV	REAL	5	5	FFA	APRAY	NAV
112	FILAT	REAL	IMUDAT	NAV	REAL	225	225	GAINS	APRAY	NAV
71	G2P	REAL	NAV	NAV	REAL	74	74	H	APRAY	NAV
4	H	REAL	TRAJIN	NAV	REAL	14	14	H01	APRAY	NAV
15	H01	REAL	IMUDAT	NAV	REAL	22	22	H01	APRAY	NAV
137	H02P	REAL	NAV	NAV	REAL	21	21	H02P	APRAY	NAV
251	IGAINP	INTEGER	APRAY	NAV	REAL	51	51	IGAINP	APRAY	NAV
20	IGAINP	INTEGER	APRAY	NAV	REAL	51	51	IGAINP	APRAY	NAV
127	IPC	INTEGER	APRAY	NAV	REAL	17	17	IPC	APRAY	NAV
67	ITRFL	INTEGER	APRAY	NAV	REAL	15	15	ITRFL	APRAY	NAV
105	LAT	REAL	NAV	NAV	REAL	1	1	LAT	APRAY	NAV
106	LONG	REAL	NAV	NAV	REAL	20	20	LONG	APRAY	NAV
2	LONGT	REAL	TRAJIN	NAV	REAL	211	211	LONGT	APRAY	NAV
214	OCY	REAL	NAV	NAV	REAL	215	215	OCY	APRAY	NAV
222	OFILP	REAL	NAV	NAV	REAL	175	175	OFILP	APRAY	NAV
142	OV92P	REAL	NAV	NAV	REAL	1	1	OV92P	APRAY	NAV
5	PLOT1M	REAL	IMUDAT	NAV	REAL	6	6	PLOT1M	APRAY	NAV
216	Q2P05	REAL	APRAY	NAV	REAL	13	13	Q2P05	APRAY	NAV
9	RESID	REAL	APRAY	NAV	REAL	11	11	RESID	APRAY	NAV
17	RHO	REAL	NAV	NAV	REAL	3	3	RHO	APRAY	NAV
65	RSHAY	REAL	IMUDAT	NAV	REAL	7	7	RSHAY	APRAY	NAV
2	R	REAL	IMUDAT	NAV	REAL	76	76	R	APRAY	NAV
23	SALFAT	REAL	TRAJIN	NAV	REAL	13	13	SALFAT	APRAY	NAV
15	SFATP	REAL	IMUDAT	NAV	REAL	21	21	SFATP	APRAY	NAV
52	SSX0	REAL	IMUDAT	NAV	REAL	51	51	SSX0	APRAY	NAV
64	SSZ0	REAL	IMUDAT	NAV	REAL	145	145	SSZ0	APRAY	NAV
4	STOP	REAL	IMUDAT	NAV	REAL	63	63	STOP	APRAY	NAV
57	TEMP	REAL	APRAY	NAV	REAL	69	69	TEMP	APRAY	NAV
55	TIMEPT	REAL	APRAY	NAV	REAL	17	17	TIMEPT	APRAY	NAV
1	TIME	REAL	TRAJIN	NAV	REAL	1	1	TIME	APRAY	NAV
12	TOLJ05	REAL	IMUDAT	NAV	REAL	194	194	TOLJ05	APRAY	NAV
42	TRESID	REAL	IMUDAT	NAV	REAL	11	11	TRESID	APRAY	NAV
2	VOUANT	REAL	NAV	NAV	REAL	12	12	VOUANT	APRAY	NAV
197	V92	REAL	NAV	NAV	REAL	125	125	V92	APRAY	NAV
7	W01	REAL	IMUDAT	NAV	REAL	124	124	W01	APRAY	NAV
66	W01	REAL	IMUDAT	NAV	REAL	147	147	W01	APRAY	NAV
157	XH	REAL	NAV	NAV	REAL	147	147	XH	APRAY	NAV
146	XSP01	REAL	NAV	NAV	REAL	147	147	XSP01	APRAY	NAV
125	XSP02	REAL	NAV	NAV	REAL	147	147	XSP02	APRAY	NAV

EXTERNALS  
COS. TYPE ARCS  
MATVEC REAL 1 LIBRARY 1  
POTVX 3 7 REAL 1 LIBRARY

COMMON BLOCKS LENGTH  
INPUTS 56  
IMUDAT 67  
MAY 192  
TRAJIN 21  
UNRESL 10

STATISTICS  
PROGRAM LENGTH 68 54  
CW LABELED COMMON LENGTH 5200 336







VARIABLES	SN	TYPE	RELOCATION	0	TIME	REAL	TPAJN
63	THIRO	REAL	NAV	13	TOLJCK	REAL	INPUTS
17	TIMED	REAL	TPAJN	1	TQUANT	REAL	TPAJN
4	TPREV	REAL	CONTR	134	V2HP	REAL	NAV
42	TPRESI	REAL	APRAY	17	VAT	REAL	TPAJN
2	VOUANT	REAL	INPUTS	11	V22	REAL	APRAY
107	V92	REAL	NAV	65	NAV	REAL	APRAY
12	W1	REAL	IMUNAT	142	XH	REAL	NAV
125	XCALF	REAL	NAV	146	VSPPHI	REAL	NAV
124	XSELF	REAL	NAV	125	/30920	REAL	NAV
147	V92P	REAL	NAV				

FILE NAMES CODE  
FMT

EXTERNALS	TYPE	A-GS	COS	REAL	1 LIBRARY
AIUOE	0				0
INITI	0		INFC		7
MAIPAN	2		PATZVN		0
SIN	1 LIBRARY		SSATT		0
SSATUD	0		SSITIG		0

1-218 STATEMENT LABELS 147 6 FMT 67 000

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
47	5	1	43 44	49	INSTACK

COMMON	BLOCKS	LENGTH
CONTROL	9	
IMUNAT	57	
INPUTS	56	
NAV	142	
TPAJN	21	

STATISTICS	PROGRAM LENGTH	1600	112
CM LABELD COMMON LENGTH	5173	315	



05/25/76 17.24.45

FIN 4.5+0405

SUBROUTINE SSIEF4 74/74 OPJ=0 IRACE

ENTRY POINTS  
1 SSIFRM

VARIABLES	SN	TYPE	LOCATION	3	ALF21	REAL	TRAJTH
33 A	75	REAL	ARRAY	9	ADUANT	REAL	TRAJTH
75 ALPHA	44	REAL	NAV	44	D	REAL	NAV
100 AFSIO	24	REAL	IMUDAT	24	CALF9T	REAL	TRAJTH
77 CALF	13	REAL	NAV	13	CW01	REAL	TRAJTH
22 CLAT9T	12	REAL	TRAJTH	12	CW03	REAL	TRAJTH
11 CWP2	9	REAL	IMUDAT	9	CW02P	REAL	NAV
155 CWP00	177	REAL	NAV	177	CW35	REAL	NAV
154 CWP40	66	REAL	NAV	66	C1102P	REAL	IMUDAT
45 C1000	67	REAL	IMUDAT	67	CW04T	REAL	IMUDAT
20 CWP05	22	REAL	ARRAY	22	CW040	REAL	NAV
31 CWP15	103	REAL	IMUDAT	103	CFLT	REAL	NAV
153 CFW	16	REAL	NAV	16	CFLTS	REAL	TRAJTH
123 DELTA	210	REAL	NAV	210	CW02P	REAL	NAV
66 JCSMAX	14	REAL	IMUDAT	14	CW02P	REAL	NAV
3 CWP0P	6	REAL	ARRAY	6	CW02P	REAL	NAV
4 EF	101	REAL	UNVPSL	101	C12	REAL	UNVPSL
5 ESO	5	REAL	IMUDAT	5	C12	REAL	NAV
6 ETAGP	23	REAL	ARRAY	23	C12	REAL	TRAJTH
112 FILATT	235	REAL	ARRAY	235	C12	REAL	NAV
71 G0P	74	REAL	NAV	74	C12	REAL	NAV
4 H0	1	REAL	TRAJTH	1	HPT	REAL	UNVPSL
15 HSOIHC	14	REAL	IMUDAT	14	HSOITM	REAL	TRAJTH
17 HVP2P	75	REAL	NAV	75	I	REAL	TRAJTH
22 IERLIM	263	REAL	IMUDAT	263	ICATND	REAL	NAV
21 IEMTYP	23	REAL	IMUDAT	23	INOC	REAL	TRAJTH
51 IOPHLP	67	REAL	IMUDAT	67	IPC	REAL	TRAJTH
17 ITATV	77	REAL	IMUDAT	77	ITFIL	REAL	TRAJTH
16 ITONAV	1	REAL	NAV	1	LATOT	REAL	TRAJTH
105 LAT	23	REAL	NAV	23	LONG	REAL	TRAJTH
106 LONG	212	REAL	NAV	212	ONX	REAL	NAV
2 LONGST	215	REAL	NAV	215	ONX	REAL	NAV
214 ODY	175	REAL	NAV	175	ONX	REAL	NAV
222 OFILTP	3	REAL	NAV	3	PT	REAL	NAV
142 OV02P	6	REAL	NAV	6	PNT	REAL	UNVPSL
5 PLOTTH	13	REAL	NAV	13	PAPER	REAL	UNVPSL
214 OP095	11	REAL	NAV	11	P50	REAL	UNVPSL
7 P0STIN	3	REAL	NAV	3	P50	REAL	UNVPSL
17 QH0	7	REAL	NAV	7	P50	REAL	UNVPSL
65 QSMAX	76	REAL	NAV	76	SALE	REAL	NAV
2 R0	13	REAL	NAV	13	SALE	REAL	NAV
23 SALE9T	21	REAL	NAV	21	SLAT9T	REAL	TRAJTH
15 SF9TP	67	REAL	NAV	67	SSVR	REAL	TRAJTH
62 SSV0	145	REAL	NAV	145	SSVR	REAL	TRAJTH
64 SSV0	103	REAL	NAV	103	THP2	REAL	NAV
4 STOP	95	REAL	NAV	95	THP2	REAL	NAV
100 TEMP	0	REAL	NAV	0	TIME	REAL	NAV
63 THIC0P	13	REAL	NAV	13	TOLJPK	REAL	NAV
60 INIT00	42	REAL	NAV	42	TOLJPK	REAL	NAV
17 TTH00	2	REAL	NAV	2	VHANT	REAL	NAV
1 IGHANT	107	REAL	NAV	107	VHANT	REAL	NAV
404 V00P	7	REAL	NAV	7	VHANT	REAL	NAV
10 V0T	12	REAL	NAV	12	VHANT	REAL	NAV
11 V00P	12	REAL	NAV	12	VHANT	REAL	NAV
70 V0T	12	REAL	NAV	12	VHANT	REAL	NAV

100



**ITSS-EMILIOGHS**

ENTRY POINTS

**SSAT**

[illegible]

COMMON BLOCKS	LENGTH
IMUNAT	67
NAY	102
UNVOSI	10

STATISTICS  
PROGRAM LENGTH  
ON LAUNCHED COMMON LENS

1. The first group of students, consisting of 10 students, was assigned to the control group. They were given the standard curriculum and no additional instruction.

100



## SUBROUTINE LLINIG

```

C
C
C SUBROUTINE TO COMPUTE MISALIGNMENTS BETWEEN ACTUAL AND
C IDEAL LLWA PLATFORM FRAMES. TRANSFORM TRAJECTORY SPECIFIC
C FORCE TO ACTUAL PLATFORM FRAME, AND INTEGRATE SPECIFIC
C FORCE. DELTA-VELOCITIES ARE COMPUTED IN THE LLWA
C PLATFORM FRAME (WEN AXES).
C
C
C IMPLICIT REAL*8 (A-H,I-Z)
C COMMON /COMMON/ LINE, PLINE, PLTIME, PLTIME, PLTIME,
C 1 TORCV, TINT, TSTOP, TMCVL, VC4CVP,
C 1 COMMON /IMUCAT/ RESID(3), DVVP(3),
C 1 SP9TP(3), C2095T(3,3), C095T(3,3), T0ESIN(3), C100J(3,3),
C 2 C1092P(3,3), C2095T(3,3), ARESID(3)
C 15 COMMON /INPCT/ AQUANT, FQUANT,
C 1 SIOP, PLTIME,
C 2 CUV, CUV, TOLJOK,
C 2 ITPMAV, ITPATT, INCOP,
C 3 IPC(30), TOPHLP, SSK3,
C 4 RTHAX, CUSHAY, TREFIL
C 20 COMMON /HAY/ C092P(3,3), V42P(3),
C 1 C092P(3,3), A13(3),
C 2 TINTCOR(3), HXV(3),
C 3 SALS, CALF,
C 4 LAT, LONG,
C 5 XCALF, XCALF,
C 6 SP9HI, XSP9HI,
C 7 C0910(3,3), C092P(3,3), OH3,
C 8 OHV, OHV,
C 9 GAIN(3,3,3), IGATMP(3),
C 10 COMMON /INVERSL/ PI,
C 1 EF, FSO,
C 2 RESQ
C
C COMMON /TRAJIT/ LINE,
C 1 H3, FLAG(3),
C 2 TIMFG, LONGQ,
C 3 CALFQI
C DIMENSION THP(3)
C FOUTVALFNCE (THP(1),H(1))
C
C 10 IF (IOPNLP .NE. 0) GO TO 50
C
C TRANSFORM TRAJECTORY VELOCITIES TO LUN FRAME(FUN4)
C
C VN = CALFQI*V9(1) - SALS*V9(12)
C VF = -SALS*V9(11) - CALFQI*V9(12)
C
C COMPUTE RADIUS OF CURVATURE
C
C THP1 = 1.0/((1.0 - ESQ)*SLATQI**2)
C THP2 = SORT(THP1)
C RP = H3 + 20*THP2
C QW = H3 + RESQ*THP1*THP2
C
C COMPUTE TOTAL VEHICLE ANGULAR RATES
C
C WT(1) = H3*SLATQI

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17.24.45

ELN 9.5+2605

SUBROUTINE ALINIC F4774 LOBIO-IRACE

05/25/76

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SYMBOLIC REFERENCE MAP (R=1)

ENTRY POINTS

1 LINIC

VARIABLES	SN	TYPE	RELOCATION	3	ALFQ	DEAL	TPAJTH
34 A	34	ARRAY	NAV	3	ALFQ	DEAL	TPAJTH
75 ALPHA	75	REAL	NAV	3	ALFQ	DEAL	TPAJTH
175 ACESLO	175	REAL	IMMUT	24	R	DEAL	TPAJTH
77 CALF	77	REAL	NAV	24	CALFQ	DEAL	TPAJTH
27 CLATOT	27	REAL	TPAJTH	10	CV01	DEAL	TPAJTH

VARIABLES	SN	TYPE	RELOCATION	12	CV03	REAL	ARRAY	INPUTS
111 CV02	11	REAL	RELOCATION	12	CV03	REAL	ARRAY	INPUTS
165 C0P90	165	REAL	ARRAY	177	C0P92P	REAL	ARRAY	NAV
154 C0910	154	REAL	ARRAY	56	C095	REAL	ARRAY	NAV
145 C1000	145	REAL	ARRAY	67	C1002P	REAL	ARRAY	INPUTS
20 C2P95	20	REAL	ARRAY	22	C2P95T	REAL	ARRAY	INPUTS
31 C9MIS	31	REAL	ARRAY	100	C92HO	REAL	ARRAY	NAV
153 DELH	153	REAL	NAV	16	DELTS	REAL	ARRAY	TRAJIN
123 DELTA	123	REAL	NAV	210	OV502P	REAL	ARRAY	NAV
66 DRSHAX	66	REAL	INPUTS	14	OV32P	REAL	ARRAY	NAV
3 DV9P	3	REAL	ARRAY	6	FFR0	REAL	ARRAY	NAV
4 EF	4	REAL	UNVSL	191	STA	REAL	ARRAY	NAV
5 ESQ	5	REAL	UNVSL	5	TA9T	REAL	ARRAY	NAV
6 EIA9P	6	REAL	INPUTS	225	GAINS	REAL	ARRAY	NAV
112 FILAT7	112	REAL	ARRAY	74	H	REAL	ARRAY	NAV
71 G92P	71	REAL	ARRAY	14	H0T	REAL	ARRAY	NAV
4 HB	4	REAL	TRAJIN	14	H0T	REAL	ARRAY	NAV
15 H50INC	15	REAL	INPUTS	178	I	INTEGER	ARRAY	NAV
137 HV92P	137	REAL	NAV	10	ICMCP	INTEGER	ARRAY	NAV
22 ICMCYL	22	INTEGER	CONTROL	253	IGAINP	INTEGER	ARRAY	NAV
24 IFPLIN	24	INTEGER	INPUTS	51	INCP	INTEGER	ARRAY	NAV
5 INIL	5	INTEGER	CONTROL	6	ISTOE	INTEGER	ARRAY	NAV
127 IPC	127	INTEGER	ARRAY	57	ITFIL	INTEGER	ARRAY	NAV
17 IIPAT	17	INTEGER	INPUTS	105	LAT	REAL	ARRAY	NAV
16 IIPNAV	16	INTEGER	INPUTS	105	LONG	REAL	ARRAY	NAV
1 LAT9T	1	REAL	TRAJIN	2	LONGST	REAL	ARRAY	NAV
20 LONGJ	20	REAL	TRAJIN	214	ON	REAL	ARRAY	NAV
213 ONX	213	REAL	NAV	227	OFFLIP	REAL	ARRAY	NAV
215 ONZ	215	REAL	NAV	0	OTIME	REAL	ARRAY	NAV
176 ONP	176	REAL	NAV	0	PT	REAL	ARRAY	NAV
142 OV92P	142	REAL	ARRAY	2	PLTIME	REAL	ARRAY	NAV
5 PLOTIN	5	REAL	INPUTS	10	PADDER	REAL	ARRAY	NAV
6 P9MT	6	REAL	INPUTS	11	P9SO	REAL	ARRAY	NAV
216 P2P95	216	REAL	ARRAY	165	PH	REAL	ARRAY	NAV
3 PFSIO	3	REAL	ARRAY	3	P9J	REAL	ARRAY	NAV
174 PHO	174	REAL	ARRAY	1	P9TIME	REAL	ARRAY	NAV
164 QP	164	REAL	INPUTS	2	Q	REAL	ARRAY	NAV
65 RSMAX	65	REAL	INPUTS	23	SALF9T	REAL	ARRAY	NAV
7 RST9	7	REAL	INPUTS	15	SE9P	REAL	ARRAY	NAV
75 SALE	75	REAL	NAV	52	SSX0	REAL	ARRAY	NAV
17 SF9T	17	REAL	TRAJIN	64	SS70	REAL	ARRAY	NAV
21 SLAT9T	21	REAL	TRAJIN	4	STOP	REAL	ARRAY	NAV
63 SSV0	63	REAL	INPUTS	63	THICOR	REAL	ARRAY	NAV
1 START	1	REAL	INPUTS	50	THICOR	REAL	ARRAY	NAV
145 S2PHI	145	REAL	NAV	17	TIME0	REAL	ARRAY	NAV
55 IMERT	55	REAL	NAV	152	TM01	REAL	ARRAY	NAV
0 TIME	0	REAL	TRAJIN	13	TOLJOK	REAL	ARRAY	NAV
44 TMP	44	REAL	NAV	104	VO90	REAL	ARRAY	NAV
163 TMP2	163	REAL	NAV	151	V9	REAL	ARRAY	NAV
4 TPREV	4	REAL	CONTROL	10	V9T	REAL	ARRAY	NAV
49 TRFSIO	49	REAL	INPUTS	11	V92P	REAL	ARRAY	NAV
161 VF	161	REAL	ARRAY	12	WT	REAL	ARRAY	NAV
2 VOUANT	2	REAL	INPUTS	167	WTN	REAL	ARRAY	NAV
107 V92	107	REAL	NAV	125	XCALF	REAL	ARRAY	NAV
7 WE9T	7	REAL	NAV					
165 WTE	165	REAL	NAV					
54 WYV	54	REAL	NAV					



LINE	STATEMENT	ADDRESS	OPERATION	DATA
1	SUBROUTINE LLAUO			
2				
3	SUBROUTINE TO COMPUTE THE GIMBAL ANGLES WHICH WOULD BE			
4	GENERATED BY THE ACTUAL LLHA IMU. FOUR GIMBAL ANGLES ARE			
5	GENERATED TO SIMULATED INNER ROLL, OUTER ROLL, PITCH, AND			
6	YAW. HOWEVER, THE INNER ROLL ANGLE IS ALWAYS ZERO.			
7	GENERATED BY THE ACTUAL LLHA IMU.			
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10	ETAP(1) = 0.0			
11	ETAP(2) = 0.0			
12	ETAP(3) = 0.0			
13	ETAP(4) = 0.0			
14	ETAP(5) = 0.0			
15	ETAP(6) = 0.0			
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19	ETAP(10) = 0.0			
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85	ETAP(76) = 0.0			
86	ETAP(77) = 0.0			
87	ETAP(78) = 0.0			

920747

## SYMBOLIC REFERENCE MAP (Q=1)

## ENTRY POINTS

## 1. LIAUD

VARIABLES	SM	TYPE	RELOCATION	3	ALFQY	REAL	TOAJM
73 A	REAL	ARRAY	NAV	0	ALFQY	REAL	TOAJM
75 ALPHA	REAL	NAV	NAV	44	ALFQY	REAL	TOAJM
100 APESIO	REAL	ARRAY	IMUAT	24	CALFQY	REAL	TOAJM
77 GLE	REAL	NAV	NAV	11	CVQY	REAL	TOAJM
22 CLAT91	REAL	TOAJM	TOAJM	12	CVQY	REAL	TOAJM
11 CVQ2	REAL	NAV	NAV	0	CVQY	REAL	TOAJM
165 CQ90	REAL	ARRAY	NAV	177	CVQY	REAL	TOAJM
154 CQ91	REAL	ARRAY	NAV	56	CVQY	REAL	TOAJM
45 C1090	REAL	ARRAY	IMUAT	57	C2095I	REAL	TOAJM
23 C2095	REAL	ARRAY	IMUAT	102	C2095I	REAL	TOAJM
31 C2095	REAL	ARRAY	IMUAT	102	C2095I	REAL	TOAJM
153 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
123 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
55 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
3 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
5 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
171 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
225 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
74 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
15 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
117 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
263 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
21 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
61 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
67 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
105 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
106 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
214 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
222 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
9 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
5 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
215 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
17 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
78 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
21 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
61 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
145 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM
57 C2095	REAL	NAV	NAV	102	C2095I	REAL	TOAJM













05/25/76 17.24.48

FIN.4.5+R4UE

74774 CRPG-TRACE

SUBROUTINE IINIT

VARIABLES	SN	TYPE	RELOCATION	10	PAOPFQ	REAL	UNVPSL
216 Q2P05	REAL	ARRAY	NAV	11	PF50	REAL	UNVPSL
0 RESID	REAL	ARRAY	IMUAT	3	PR9	REAL	UNVPSL
17 QH0	REAL	ARRAY	NAV	3	RSYME	REAL	UNVPSL
65 RSMAX	REAL	INPUTS	INPUTS	2	PA	REAL	UNVPSL
7 RSTOT	REAL	NAV	NAV	23	SALFQI	REAL	TRAJIN
76 SALT	REAL	ARRAY	TRAJIN	15	SFQIP	REAL	THUDAT
13 SFQI	REAL	ARRAY	TRAJIN	62	SSX0	REAL	THUDAT
21 SLATQI	REAL	INPUTS	INPUTS	64	SS70	REAL	THUDAT
63 SSY0	REAL	INPUTS	INPUTS	6	STOP	REAL	THUDAT
7 START	REAL	NAV	NAV	63	THYCOR	REAL	THUDAT
145 S2PHT	REAL	ARRAY	NAV	60	THYCOR	REAL	THUDAT
55 THYCOR	REAL	ARRAY	NAV	17	THYF0	REAL	THUDAT
0 TIME	REAL	INPUTS	INPUTS	4	TOF5V	REAL	THUDAT
13 TOLJPK	REAL	INPUTS	INPUTS	42	TOF5I0	REAL	THUDAT
1 TOUTANT	REAL	NAV	NAV	2	VQUANT	REAL	THUDAT
124 VOMP	REAL	ARRAY	TRAJIN	107	V72	REAL	THUDAT
19 V4T	REAL	ARRAY	NAV	7	WET	REAL	THUDAT
11 V92P	REAL	ARRAY	NAV	65	WV	REAL	THUDAT
12 WT	REAL	ARRAY	IMUAT	152	XH	REAL	THUDAT
125 XCALF	REAL	NAV	NAV	146	XS2PHT	REAL	THUDAT
124 XSALF	REAL	NAV	NAV	126	XC992P	REAL	THUDAT
147 XV92P	REAL	ARRAY	NAV			REAL	THUDAT

FILE NAMES MODE  
TAPE6 FMT

1-235

EXTERNALS	TYPE	ARGS
ATLIDE	0	0
THRFQ	0	0
LLATUD	0	0

STATEMENT LABELS

44	5	FMT
30	328	

46 7

FMT

16 9

COMMON BLOCKS LENGTH

COMMON	BLOCKS	LENGTH
CONTROL	9	
INPUT	67	
INPUTS	56	
NAV	182	
PGRAY	7	
TRAJIN	21	
UNVPSL	10	

STATISTICS

PROGRAM LENGTH	553	45
COMMON LENGTH <td>5408</td> <td>352</td>	5408	352



0679220  
U I 79220  
U J 79220  
0679220  
U I 79220  
0679220  
U I 79220  
0679220

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CTA9P(I)=ETA9P(I)+APESIN(I)
7726 APESIN(I)=CTA9P(I)
CALL QNT1Z(EVA9P,AQUANT)

```

UNCLAS  
REF ID: A65910(1)-EIA9P(1)  
IF (IPC(2).NE. 0) CALL DOUT(2)  
NEXT I

## SYMBOLIC REFERENCE MAP (Z=1).

## ENTREPRENEURS

UNITED STATES

VARIABLES	SN	TYPE	PELOCATION	ARRAY	NAV	3	ALFQI	REAL	TRAJIN
37 A	37	REAL	NAV	ARRAY	NAV	3	ALFQI	REAL	TRAJIN
75 ALPHA	75	REAL	NAV	ARRAY	NAV	0	AQUANT	REAL	TRAJIN
100 ARESIO	100	REAL	IMUDAT	ARRAY	NAV	44	B	REAL	TRAJIN
77 CALF	77	REAL	NAV	ARRAY	NAV	24	CALFQI	REAL	TRAJIN
22 CLAT9T	22	REAL	TRAJIN	ARRAY	NAV	10	CV01	REAL	TRAJIN
11 CV02	11	REAL	INPUTS	ARRAY	NAV	12	CV03	REAL	TRAJIN
155 C0P90	155	REAL	NAV	ARRAY	NAV	3	C0P92P	REAL	TRAJIN
154 C0910	154	REAL	NAV	ARRAY	NAV	177	C095	REAL	TRAJIN
45 C1390	45	REAL	IMUDAT	ARRAY	NAV	55	C1392P	REAL	TRAJIN
20 C2P95	20	REAL	IMUDAT	ARRAY	NAV	67	C2P96T	REAL	TRAJIN
31 C0M15	31	REAL	IMUDAT	ARRAY	NAV	22	C0M16	REAL	TRAJIN
153 C0LH	153	REAL	NAV	ARRAY	NAV	103	C0L1	REAL	TRAJIN
123 C0L74	123	REAL	NAV	ARRAY	NAV	16	C0L75	REAL	TRAJIN
65 C0SMAX	65	REAL	INPUTS	ARRAY	NAV	219	C0S92P	REAL	TRAJIN
2 C0V92P	2	REAL	IMUDAT	ARRAY	NAV	14	C0V92P	REAL	TRAJIN
4 EF	4	REAL	UNVSL	ARRAY	NAV	6	EF92P	REAL	TRAJIN
5 E50	5	REAL	UNVSL	ARRAY	NAV	101	ETA	REAL	TRAJIN
6 ET9P	6	REAL	IMUDAT	ARRAY	NAV	5	ET9T	REAL	TRAJIN
112 FILATT	112	REAL	NAV	ARRAY	NAV	225	GAINS	REAL	TRAJIN
71 G92P	71	REAL	NAV	ARRAY	NAV	74	H	REAL	TRAJIN
4 H9	4	REAL	TRAJIN	ARRAY	NAV	1	H91	REAL	TRAJIN
15 H50INC	15	REAL	INPUTS	ARRAY	NAV	14	H50ITM	REAL	TRAJIN
137 HV92P	137	REAL	NAV	ARRAY	NAV	157	I	REAL	TRAJIN
22 IERLIM	22	INTEGER	INPUTS	ARRAY	NAV	263	IGAINP	INTEGER	TRAJIN
21 IMUTYP	21	INTEGER	INPUTS	ARRAY	NAV	29	INCOR	INTEGER	TRAJIN
61 IOPMLP	61	INTEGER	INPUTS	ARRAY	NAV	23	IPC	INTEGER	TRAJIN
17 ITRATT	17	INTEGER	INPUTS	ARRAY	NAV	57	IT7FIL	INTEGER	TRAJIN
15 ITPNAV	15	INTEGER	INPUTS	ARRAY	NAV	150	J	INTEGER	TRAJIN
105 LAT	105	REAL	NAV	ARRAY	NAV	1	LAT9T	REAL	TRAJIN
105 LONG	105	REAL	NAV	ARRAY	NAV	20	LONGO	REAL	TRAJIN
2 LONG9T	2	REAL	TRAJIN	ARRAY	NAV	213	ONX	REAL	TRAJIN
214 ONY	214	REAL	NAV	ARRAY	NAV	215	ONZ	REAL	TRAJIN
222 OFILP	222	REAL	NAV	ARRAY	NAV	175	ONQ	REAL	TRAJIN
142 OV92P	142	REAL	NAV	ARRAY	NAV	0	PT	REAL	TRAJIN
5 PLOTIM	5	REAL	INPUTS	ARRAY	NAV	5	POINT	REAL	TRAJIN
216 R2R95	216	REAL	NAV	ARRAY	NAV	10	R2R9P	REAL	TRAJIN
2 R2T10	2	REAL	IMUDAT	ARRAY	NAV	11	R2T30	REAL	TRAJIN
37 PHO	37	REAL	NAV	ARRAY	NAV	1	R90	REAL	TRAJIN

VARIABLES	SN	TYPE	RELOCATION						
65 RSMAX	REAL	INPUTS		7	SSPT	REAL	INPUTS		
2 20	REAL	UNVSL		76	SALE	REAL	NAV		
27 SALEST	REAL	TRAJIN		163	SE	REAL			
17 SEAT	REAL	APRAY		15	SEPT	REAL	APRAY		
24 SLAT9T	REAL	TRAJIN		62	SGX3	REAL	INPUTS		
63 SSV0	REAL	INPUTS		54	SS70	REAL	INPUTS		
3 START	REAL	INPUTS		151	ST4	REAL	INPUTS		
4 STOP	REAL	INPUTS		145	SPDH1	REAL	NAV		
162 TH	REAL			63	THICND	REAL	APRAY		
55 INTERJ	REAL	APRAY	NAV	50	THTRQ	REAL	APRAY		
0 TIME	REAL	TRAJIN		17	TIME9	REAL	TRAJIN		
164 TWP	REAL	APRAY		13	TOLJOK	REAL	INPUTS		
1 TOUANT	REAL	INPUTS		42	TO-SIN	REAL	APRAY		
124 VOMP	REAL	NAV		2	VQJANT	REAL	INPUTS		
10 V9T	REAL	TRAJIN		137	V92	REAL	APRAY		
11 V920	REAL	APRAY	NAV	7	WCT	REAL	UNVSL		
12 4T	REAL	APRAY	IMUNAT	65	WV	REAL	APRAY		
125 YCALF	REAL	NAV		152	XH	REAL	NAV		
124 XSALE	REAL	NAV		145	YS2PH1	REAL	NAV		
147 XV92P	REAL	APRAY	NAV	125	XCF92P	REAL	APRAY		

EXTERNALS	TYPE	ARGS							
ASIN	REAL	1 LIBRARY		COS	REAL	1 LIBRARY			
OUT	REAL	1		MM	REAL	2			
4TH	REAL	3		ONIT7	REAL	1 LIBRARY			
ROTZY	REAL	7		SIN	REAL	1 LIBRARY			
SQPT	REAL	1 LIBRARY							

STATEMENT LABELS 0 776 0 777

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
25 15	* I		42 44	113	NOT INIFR
26 15	J		43 44	63	INSTACK
72 776	I		57 59	68	INSTACK
193 777	I		61 62	63	INSTACK

COMMON BLOCKS	LENGTH
NAV	182
IMPUTS	55
IMUNAT	67
TRAJIN	21
UNVSL	10

STATISTICS	PROGRAM LENGTH	1678	112
CP LABELED COMMON LENGTH	5208	336	

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1      SUBROUTINE SOINIT
2      THIS ROUTINE IS PART OF THE IMU SIMULATOR FOR THE STAG0000H
3      CASE. IT TRANSFORMS THE SPECIFIC FORCES FROM THE 2P FRAME
4      TO THE BODY FRAME.
5
10     IMPLICIT REAL (A-H), BFALL(7)
11     COMMON /NAV/ C092P(3,3), V02P(3,3),
12     C092P(3,3), A13(3,3),
13     THTCOR(3), W03(3), G02P(7),
14     CALF,
15     LAT, LONG,
16     XSALF, X032P(3,3), W02P(3,3),
17     S2P(1), X03PHI,
18     C092P(3,3), C092P(3,3), OHB,
19     OUX, OUY, OUZ,
20     CALF91, CALF92, CALF93,
21     COMMON /TRAJIN/ LINE,
22     HA, F091(3), V01(3),
23     LONG0, SLA91,
24     CALF91
25     DIMENSION IMP(2)
26     CALL ROTXYZ(C092P, SIN(F091(1)), COS(F091(1)), SIN(F091(2)),
27     COS(F091(2)), SIN(F091(3)), COS(F091(3)))
28     CALL MATPANA(C092P)
29     TRAIL=SF91(2)
30     IMP(2)=-SF91(2)
31     IMP(1)=SF91(1)
32     CALL NATVEC(SF91, A, TMP)
33     RETURN
34     END

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SYMBOLIC REFERENCE MAP (P=1)

ENTRY POINTS  
1 SOINIT

VARIABLES	SN	TYPE	APRAY	RELOCATION	REAL	NAV	REAL	APESID	REAL	ARRAY	IMUJTN
37 A	1	REAL	APRAY	NAV	100	77	77	77	77	77	77
38 ALPHA	2	REAL	APRAY	NAV	22	22	22	22	22	22	22
39 CALF91	3	REAL	APRAY	NAV	177	177	177	177	177	177	177
40 C092P	4	REAL	APRAY	NAV	55	55	55	55	55	55	55
41 C0910	5	REAL	APRAY	NAV	57	57	57	57	57	57	57
42 C092P	6	REAL	APRAY	NAV	101	101	101	101	101	101	101
43 C092P	7	REAL	APRAY	NAV	101	101	101	101	101	101	101
44 C092P	8	REAL	APRAY	NAV	101	101	101	101	101	101	101
45 C092P	9	REAL	APRAY	NAV	101	101	101	101	101	101	101
46 C092P	10	REAL	APRAY	NAV	101	101	101	101	101	101	101
47 C092P	11	REAL	APRAY	NAV	101	101	101	101	101	101	101
48 C092P	12	REAL	APRAY	NAV	101	101	101	101	101	101	101
49 C092P	13	REAL	APRAY	NAV	101	101	101	101	101	101	101
50 C092P	14	REAL	APRAY	NAV	101	101	101	101	101	101	101





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1      C
2      C THIS ROUTINE PERFORMS THE INITIALIZATION OF THE STRAPDOWN
3      CASE. THE DAV EQUATIONS ARE INITIALIZED WITH THE COMMON
4      SUBROUTINE.
5      C
6      C
7      C
8      C
9      C
10     C
11     C IMPLICIT REAL(A-H),PEAL(1-2)
12     C
13     C COMMON /CONTROL/ TIME, PTIME,
14     C TPREV, INIT, TSTOP,
15     C
16     C COMMON /LOCAL/ DESIG(1), DV9P(13),
17     C
18     C 1 SF9P(13), C2P95(1,3), C4P95(1,3), C6P95(1,3), C8P95(1,3),
19     C 2 C10P95(1,3), C12P95(1,3), C14P95(1,3), C16P95(1,3),
20     C 3 C18P95(1,3), C20P95(1,3), C22P95(1,3), C24P95(1,3),
21     C 4 C26P95(1,3), C28P95(1,3), C30P95(1,3), C32P95(1,3),
22     C 5 C34P95(1,3), C36P95(1,3), C38P95(1,3), C40P95(1,3),
23     C 6 C42P95(1,3), C44P95(1,3), C46P95(1,3), C48P95(1,3),
24     C 7 C50P95(1,3), C52P95(1,3), C54P95(1,3), C56P95(1,3),
25     C 8 C58P95(1,3), C60P95(1,3), C62P95(1,3), C64P95(1,3),
26     C 9 C66P95(1,3), C68P95(1,3), C70P95(1,3), C72P95(1,3),
27     C 10 C74P95(1,3), C76P95(1,3), C78P95(1,3), C80P95(1,3),
28     C 11 C82P95(1,3), C84P95(1,3), C86P95(1,3), C88P95(1,3),
29     C 12 C90P95(1,3), C92P95(1,3), C94P95(1,3), C96P95(1,3),
30     C 13 C98P95(1,3), C100P95(1,3), C102P95(1,3), C104P95(1,3),
31     C 14 C106P95(1,3), C108P95(1,3), C110P95(1,3), C112P95(1,3),
32     C 15 C114P95(1,3), C116P95(1,3), C118P95(1,3), C120P95(1,3),
33     C 16 C122P95(1,3), C124P95(1,3), C126P95(1,3), C128P95(1,3),
34     C 17 C130P95(1,3), C132P95(1,3), C134P95(1,3), C136P95(1,3),
35     C 18 C138P95(1,3), C140P95(1,3), C142P95(1,3), C144P95(1,3),
36     C 19 C146P95(1,3), C148P95(1,3), C150P95(1,3), C152P95(1,3),
37     C 20 C154P95(1,3), C156P95(1,3), C158P95(1,3), C160P95(1,3),
38     C 21 C162P95(1,3), C164P95(1,3), C166P95(1,3), C168P95(1,3),
39     C 22 C170P95(1,3), C172P95(1,3), C174P95(1,3), C176P95(1,3),
40     C 23 C178P95(1,3), C180P95(1,3), C182P95(1,3), C184P95(1,3),
41     C 24 C186P95(1,3), C188P95(1,3), C190P95(1,3), C192P95(1,3),
42     C 25 C194P95(1,3), C196P95(1,3), C198P95(1,3), C200P95(1,3),
43     C 26 C202P95(1,3), C204P95(1,3), C206P95(1,3), C208P95(1,3),
44     C 27 C210P95(1,3), C212P95(1,3), C214P95(1,3), C216P95(1,3),
45     C 28 C218P95(1,3), C220P95(1,3), C222P95(1,3), C224P95(1,3),
46     C 29 C226P95(1,3), C228P95(1,3), C230P95(1,3), C232P95(1,3),
47     C 30 C234P95(1,3), C236P95(1,3), C238P95(1,3), C240P95(1,3),
48     C 31 C242P95(1,3), C244P95(1,3), C246P95(1,3), C248P95(1,3),
49     C 32 C250P95(1,3), C252P95(1,3), C254P95(1,3), C256P95(1,3),
50     C 33 C258P95(1,3), C260P95(1,3), C262P95(1,3), C264P95(1,3),
51     C 34 C266P95(1,3), C268P95(1,3), C270P95(1,3), C272P95(1,3),
52     C 35 C274P95(1,3), C276P95(1,3), C278P95(1,3), C280P95(1,3),
53     C 36 C282P95(1,3), C284P95(1,3), C286P95(1,3), C288P95(1,3),
54     C 37 C290P95(1,3), C292P95(1,3), C294P95(1,3), C296P95(1,3),
55     C 38 C298P95(1,3), C300P95(1,3), C302P95(1,3), C304P95(1,3),
56     C 39 C306P95(1,3), C308P95(1,3), C310P95(1,3), C312P95(1,3),
57     C 40 C314P95(1,3), C316P95(1,3), C318P95(1,3), C320P95(1,3),
58     C 41 C322P95(1,3), C324P95(1,3), C326P95(1,3), C328P95(1,3),
59     C 42 C330P95(1,3), C332P95(1,3), C334P95(1,3), C336P95(1,3),
60     C 43 C338P95(1,3), C340P95(1,3), C342P95(1,3), C344P95(1,3),
61     C 44 C346P95(1,3), C348P95(1,3), C350P95(1,3), C352P95(1,3),
62     C 45 C354P95(1,3), C356P95(1,3), C358P95(1,3), C360P95(1,3),
63     C 46 C362P95(1,3), C364P95(1,3), C366P95(1,3), C368P95(1,3),
64     C 47 C370P95(1,3), C372P95(1,3), C374P95(1,3), C376P95(1,3),
65     C 48 C378P95(1,3), C380P95(1,3), C382P95(1,3), C384P95(1,3),
66     C 49 C386P95(1,3), C388P95(1,3), C390P95(1,3), C392P95(1,3),
67     C 50 C394P95(1,3), C396P95(1,3), C398P95(1,3), C400P95(1,3),
68     C 51 C402P95(1,3), C404P95(1,3), C406P95(1,3), C408P95(1,3),
69     C 52 C410P95(1,3), C412P95(1,3), C414P95(1,3), C416P95(1,3),
70     C 53 C418P95(1,3), C420P95(1,3), C422P95(1,3), C424P95(1,3),
71     C 54 C426P95(1,3), C428P95(1,3), C430P95(1,3), C432P95(1,3),
72     C 55 C434P95(1,3), C436P95(1,3), C438P95(1,3), C440P95(1,3),
73     C 56 C442P95(1,3), C444P95(1,3), C446P95(1,3), C448P95(1,3),
74     C 57 C450P95(1,3), C452P95(1,3), C454P95(1,3), C456P95(1,3),
75     C 58 C458P95(1,3), C460P95(1,3), C462P95(1,3), C464P95(1,3),
76     C 59 C466P95(1,3), C468P95(1,3), C470P95(1,3), C472P95(1,3),
77     C 60 C474P95(1,3), C476P95(1,3), C478P95(1,3), C480P95(1,3),
78     C 61 C482P95(1,3), C484P95(1,3), C486P95(1,3), C488P95(1,3),
79     C 62 C490P95(1,3), C492P95(1,3), C494P95(1,3), C496P95(1,3),
80     C 63 C498P95(1,3), C500P95(1,3), C502P95(1,3), C504P95(1,3),
81     C 64 C506P95(1,3), C508P95(1,3), C510P95(1,3), C512P95(1,3),
82     C 65 C514P95(1,3), C516P95(1,3), C518P95(1,3), C520P95(1,3),
83     C 66 C522P95(1,3), C524P95(1,3), C526P95(1,3), C528P95(1,3),
84     C 67 C530P95(1,3), C532P95(1,3), C534P95(1,3), C536P95(1,3),
85     C 68 C538P95(1,3), C540P95(1,3), C542P95(1,3), C544P95(1,3),
86     C 69 C546P95(1,3), C548P95(1,3), C550P95(1,3), C552P95(1,3),
87     C 70 C554P95(1,3), C556P95(1,3), C558P95(1,3), C560P95(1,3),
88     C 71 C562P95(1,3), C564P95(1,3), C566P95(1,3), C568P95(1,3),
89     C 72 C570P95(1,3), C572P95(1,3), C574P95(1,3), C576P95(1,3),
90     C 73 C578P95(1,3), C580P95(1,3), C582P95(1,3), C584P95(1,3),
91     C 74 C586P95(1,3), C588P95(1,3), C590P95(1,3), C592P95(1,3),
92     C 75 C594P95(1,3), C596P95(1,3), C598P95(1,3), C600P95(1,3),
93     C 76 C602P95(1,3), C604P95(1,3), C606P95(1,3), C608P95(1,3),
94     C 77 C610P95(1,3), C612P95(1,3), C614P95(1,3), C616P95(1,3),
95     C 78 C618P95(1,3), C620P95(1,3), C622P95(1,3), C624P95(1,3),
96     C 79 C626P95(1,3), C628P95(1,3), C630P95(1,3), C632P95(1,3),
97     C 80 C634P95(1,3), C636P95(1,3), C638P95(1,3), C640P95(1,3),
98     C 81 C642P95(1,3), C644P95(1,3), C646P95(1,3), C648P95(1,3),
99     C 82 C650P95(1,3), C652P95(1,3), C654P95(1,3), C656P95(1,3),
100    C 83 C658P95(1,3), C660P95(1,3), C662P95(1,3), C664P95(1,3),
101    C 84 C666P95(1,3), C668P95(1,3), C670P95(1,3), C672P95(1,3),
102    C 85 C674P95(1,3), C676P95(1,3), C678P95(1,3), C680P95(1,3),
103    C 86 C682P95(1,3), C684P95(1,3), C686P95(1,3), C688P95(1,3),
104    C 87 C690P95(1,3), C692P95(1,3), C694P95(1,3), C696P95(1,3),
105    C 88 C698P95(1,3), C700P95(1,3), C702P95(1,3), C704P95(1,3),
106    C 89 C706P95(1,3), C708P95(1,3), C710P95(1,3), C712P95(1,3),
107    C 90 C714P95(1,3), C716P95(1,3), C718P95(1,3), C720P95(1,3),
108    C 91 C722P95(1,3), C724P95(1,3), C726P95(1,3), C728P95(1,3),
109    C 92 C730P95(1,3), C732P95(1,3), C734P95(1,3), C736P95(1,3),
110    C 93 C738P95(1,3), C740P95(1,3), C742P95(1,3), C744P95(1,3),
111    C 94 C746P95(1,3), C748P95(1,3), C750P95(1,3), C752P95(1,3),
112    C 95 C754P95(1,3), C756P95(1,3), C758P95(1,3), C760P95(1,3),
113    C 96 C762P95(1,3), C764P95(1,3), C766P95(1,3), C768P95(1,3),
114    C 97 C770P95(1,3), C772P95(1,3), C774P95(1,3), C776P95(1,3),
115    C 98 C778P95(1,3), C780P95(1,3), C782P95(1,3), C784P95(1,3),
116    C 99 C786P95(1,3), C788P95(1,3), C790P95(1,3), C792P95(1,3),
117    C 100 C794P95(1,3), C796P95(1,3), C798P95(1,3), C800P95(1,3),
118    C 101 C802P95(1,3), C804P95(1,3), C806P95(1,3), C808P95(1,3),
119    C 102 C810P95(1,3), C812P95(1,3), C814P95(1,3), C816P95(1,3),
120    C 103 C818P95(1,3), C820P95(1,3), C822P95(1,3), C824P95(1,3),
121    C 104 C826P95(1,3), C828P95(1,3), C830P95(1,3), C832P95(1,3),
122    C 105 C834P95(1,3), C836P95(1,3), C838P95(1,3), C840P95(1,3),
123    C 106 C842P95(1,3), C844P95(1,3), C846P95(1,3), C848P95(1,3),
124    C 107 C850P95(1,3), C852P95(1,3), C854P95(1,3), C856P95(1,3),
125    C 108 C858P95(1,3), C860P95(1,3), C862P95(1,3), C864P95(1,3),
126    C 109 C866P95(1,3), C868P95(1,3), C870P95(1,3), C872P95(1,3),
127    C 110 C874P95(1,3), C876P95(1,3), C878P95(1,3), C880P95(1,3),
128    C 111 C882P95(1,3), C884P95(1,3), C886P95(1,3), C888P95(1,3),
129    C 112 C890P95(1,3), C892P95(1,3), C894P95(1,3), C896P95(1,3),
130    C 113 C898P95(1,3), C900P95(1,3), C902P95(1,3), C904P95(1,3),
131    C 114 C906P95(1,3), C908P95(1,3), C910P95(1,3), C912P95(1,3),
132    C 115 C914P95(1,3), C916P95(1,3), C918P95(1,3), C920P95(1,3),
133    C 116 C922P95(1,3), C924P95(1,3), C926P95(1,3), C928P95(1,3),
134    C 117 C930P95(1,3), C932P95(1,3), C934P95(1,3), C936P95(1,3),
135    C 118 C938P95(1,3), C940P95(1,3), C942P95(1,3), C944P95(1,3),
136    C 119 C946P95(1,3), C948P95(1,3), C950P95(1,3), C952P95(1,3),
137    C 120 C954P95(1,3), C956P95(1,3), C958P95(1,3), C960P95(1,3),
138    C 121 C962P95(1,3), C964P95(1,3), C966P95(1,3), C968P95(1,3),
139    C 122 C970P95(1,3), C972P95(1,3), C974P95(1,3), C976P95(1,3),
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141    C 124 C986P95(1,3), C988P95(1,3), C990P95(1,3), C992P95(1,3),
142    C 125 C994P95(1,3), C996P95(1,3), C998P95(1,3), C1000P95(1,3),
143    C 126 C1002P95(1,3), C1004P95(1,3), C1006P95(1,3), C1008P95(1,3),
144    C 127 C1010P95(1,3), C1012P95(1,3), C1014P95(1,3), C1016P95(1,3),
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148    C 131 C1042P95(1,3), C1044P95(1,3), C1046P95(1,3), C1048P95(1,3),
149    C 132 C1050P95(1,3), C1052P95(1,3), C1054P95(1,3), C1056P95(1,3),
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153    C 136 C1082P95(1,3), C1084P95(1,3), C1086P95(1,3), C1088P95(1,3),
154    C 137 C1090P95(1,3), C1092P95(1,3), C1094P95(1,3), C1096P95(1,3),
155    C 138 C1098P95(1,3), C1100P95(1,3), C1102P95(1,3), C1104P95(1,3),
156    C 139 C1106P95(1,3), C1108P95(1,3), C1110P95(1,3), C1112P95(1,3),
157    C 140 C1114P95(1,3), C1116P95(1,3), C1118P95(1,3), C1120P95(1,3),
158    C 141 C1122P95(1,3), C1124P95(1,3), C1126P95(1,3), C1128P95(1,3),
159    C 142 C1130P95(1,3), C1132P95(1,3), C1134P95(1,3), C1136P95(1,3),
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162    C 145 C1154P95(1,3), C1156P95(1,3), C1158P95(1,3), C1160P95(1,3),
163    C 146 C1162P95(1,3), C1164P95(1,3), C1166P95(1,3), C1168P95(1,3),
164    C 147 C1170P95(1,3), C1172P95(1,3), C1174P95(1,3), C1176P95(1,3),
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167    C 150 C1194P95(1,3), C1196P95(1,3), C1198P95(1,3), C1200P95(1,3),
168    C 151 C1202P95(1,3), C1204P95(1,3), C1206P95(1,3), C1208P95(1,3),
169    C 152 C1210P95(1,3), C1212P95(1,3), C1214P95(1,3), C1216P95(1,3),
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175    C 158 C1258P95(1,3), C1260P95(1,3), C1262P95(1,3), C1264P95(1,3),
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180    C 163 C1298P95(1,3), C1300P95(1,3), C1302P95(1,3), C1304P95(1,3),
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188    C 171 C1362P95(1,3), C1364P95(1,3), C1366P95(1,3), C1368P95(1,3),
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191    C 174 C1386P95(1,3), C1388P95(1,3), C1390P95(1,3), C1392P95(1,3),
192    C 175 C1394P95(1,3), C1396P95(1,3), C1398P95(1,3), C1400P95(1,3),
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201    C 184 C1466P95(1,3), C1468P95(1,3), C1470P95(1,3), C1472P95(1,3),
202    C 185 C1474P95(1,3), C1476P95(1,3), C1478P95(1,3), C1480P95(1,3),
203    C 186 C1482P95(1,3), C1484P95(1,3), C1486P95(1,3), C1488P95(1,3),
204    C 187 C1490P95(1,3), C1492P95(1,3), C1494P95(1,3), C1496P95(1,3),
205    C 188 C1498P95(1,3), C1500P95(1,3), C1502P95(1,3), C1504P95(1,3),
206    C 189 C1506P95(1,3), C1508P95(1,3), C1510P95(1,3), C1512P95(1,3),
207    C 190 C1514P95(1,3), C1516P95(1,3), C1518P95(1,3), C1520P95(1,3),
208    C 191 C1522P95(1,3), C1524P95(1,3), C1526P95(1,3), C1528P95(1,3),
209    C 192 C1530P95(1,3), C1532P95(1,3), C1534P95(1,3), C1536P95(1,3),
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212    C 195 C1554P95(1,3), C1556P95(1,3), C1558P95(1,3), C1560P95(1,3),
213    C 196 C1562P95(1,3), C1564P95(1,3), C1566P95(1,3), C1568P95(1,3),
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217    C 200 C1594P95(1,3), C1596P95(1,3), C1598P95(1,3), C1600P95(1,3),
218    C 201 C1602P95(1,3), C1604P95(1,3), C1606P95(1,3), C1608P95(1,3),
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223    C 206 C1642P95(1,3), C1644P95(1,3), C1646P95(1,3), C1648P95(1,3),
224    C 207 C1650P95(1,3
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112 3239  
113 3349

112 3239  
113 3349

9888 RETURN END

UN  
RETU

## SYMBOLIC DIFFERENCE MAP (D=1)

**FIVE POINTS UNIT**

# SPRINT

VARIABLES		SN	TYPE	RELOCATION		SN		TYPE
33	A	REAL	ARRAY	NAV	3	ALF9T	REAL	TRAJIN
75	ALPHA	REAL	NAV	NAV	0	AQUANT	REAL	THRUITS
110	ARESIO	REAL	ARRAY	IMUDAT	44	T	REAL	NAV
77	CALF	REAL	NAV	NAV	24	CALF9T	REAL	TRAJIN
22	CLAT9T	REAL	TRAJIN	INPUTS	10	CV71	REAL	THRUITS
11	CV02	REAL	NAV	NAV	12	CV71	REAL	THRUITS
155	CO90	REAL	ARRAY	NAV	3	CO92P	REAL	NAV
154	CO910	REAL	ARRAY	NAV	177	C435	REAL	NAV
45	CO990	REAL	ARRAY	IMUDAT	55	CO92P	REAL	THRUITS
20	C2P95	REAL	ARRAY	IMUDAT	57	C2P95T	REAL	THRUITS
31	C9M15	REAL	ARRAY	IMUDAT	22	C4340	REAL	NAV
153	DELTA	REAL	NAV	NAV	103	DELTA	REAL	NAV
123	DELTA	REAL	NAV	NAV	16	DELTA	REAL	TRAJIN
66	DESMAX	REAL	NAV	INPUTS	211	DESMAX	REAL	NAV
3	DV0P	REAL	ARRAY	IMUDAT	14	DV32P	REAL	NAV
101	ETA	REAL	ARRAY	NAV	6	F499P	REAL	THRUITS
5	ETA9T	REAL	ARRAY	TRAJIN	112	F499T	REAL	NAV
225	GATHS	REAL	ARRAY	NAV	71	G02P	REAL	NAV
74	H	REAL	NAV	NAV	4	H0	REAL	TRAJIN
15	H0INC	REAL	NAV	INPUTS	14	H0INC	REAL	THRUITS
137	HV92P	REAL	ARRAY	NAV	157	I	INTEGER	CONTROL
7	ICM0VL	INTEGER	CONTROL	CONTROL	10	ICM0VP	INTEGER	NAV
22	IF0LIM	INTEGER	INPUTS	INPUTS	253	ICM0VP	INTEGER	THRUITS
21	IM0TVP	INTEGER	INPUTS	INPUTS	20	ICM0C	INTEGER	THRUITS
5	IPC	INTEGER	CONTROL	CONTROL	51	IPC0LP	INTEGER	CONTROL
23	IPC	INTEGER	ARRAY	INPUTS	6	IPC0LP	INTEGER	THRUITS
17	IT0ATI	INTEGER	INPUTS	INPUTS	57	IT0ATI	INTEGER	NAV
16	IT0NAV	INTEGER	INPUTS	INPUTS	105	LAT	REAL	NAV
1	LAT9T	REAL	TRAJIN	TRAJIN	105	LONG	REAL	TRAJIN
20	LONG	REAL	TRAJIN	TRAJIN	2	LONG	REAL	NAV
213	ONX	REAL	NAV	NAV	214	ONX	REAL	NAV
215	ON7	REAL	NAV	NAV	222	ON7LIR	REAL	NAV
125	ONP	REAL	NAV	NAV	0	ON7LIR	REAL	CONTROL
142	OV42P	REAL	ARRAY	NAV	5	OV42P	REAL	THRUITS
2	PLTIME	REAL	CONTROL	CONTROL	5	P0NT	REAL	INPUTS
1	PLTIME	REAL	CONTROL	CONTROL	216	P0NT95	REAL	NAV
0	P0NT	REAL	ARRAY	IMUDAT	17	P0NT	REAL	NAV
65	P0NAX	REAL	INPUTS	INPUTS	3	P0NTIME	REAL	CONTROL
2	P0NT	REAL	INPUTS	INPUTS	75	P0NT	REAL	NAV
21	SALE9T	REAL	TRAJIN	TRAJIN	13	SALE9T	REAL	TRAJIN
15	SALE9T	REAL	ARRAY	IMUDAT	21	SALE9T	REAL	TRAJIN
62	SSX0	REAL	INPUTS	INPUTS	53	SSX0	REAL	THRUITS
64	SSX0	REAL	INPUTS	INPUTS	3	SSX0	REAL	THRUITS
4	STOP	REAL	INPUTS	INPUTS	145	STOP	REAL	NAV

25/25/76 17.24.45

FIM 4.543436

SUBROUTINE SOINIT 74/74 OPERATOR

VARIABLES	SM	TYPE	RELOCATION
17 INITOP	REAL	ARRAY	RAW
53 INITOP	REAL	ARRAY	RAW
17 INITOP	REAL	ARRAY	RAW
4 IPSEW	REAL	CONST	
47 IPSTO	REAL	ARRAY	INPUT
2 WQUANT	REAL	INPUT	
187 492	REAL	ARRAY	RAW
12 MT	REAL	ARRAY	INPUT
125 XCALF	REAL	RAW	
126 XSALE	REAL	RAW	
147 492P	REAL	ARRAY	RAW

FILE NAME'S MODE  
10PFB FMI

EXTERNALS	TYPE	ADDRESS
ATUNE	0	
INITI	3	
444		
2032YK	2	
SWH	1	LIBRARY

STATISTICS LABELS

51 3  
102 498

0.5

156 5 FMI

LOOPS	LABEL	INDEX	FORM-10	LENGTH	COMPARISONS
55	5	1	47 48	48	INSACK

COMMON BLOCKS	LENGTH
CONTROL	9
INPUT	67
INPUTS	56
RAW	182
TPAJIM	21

STATISTICS	PROGRAM LENGTH	1723	128
COMMON LENGTH	5178	315	







05/25/75 17.24.46

FIN 4.5+D406

SUBROUTINE HSING 74774 ORIED ISAGE

VARIABLES	SN	TYPE	RELOCATION	INPUTS	ITRFL	INTERP	INPUTS	INTERP	INPUTS
17 ITOATY	67	REAL	INPUTS	375	J	INTERP	INPUTS	INTERP	INPUTS
18 ITOATY	375	REAL	INPUTS	1	LATY	REAL	INPUTS	REAL	INPUTS
195 LAT	20	REAL	INPUTS	213	LONG	REAL	INPUTS	REAL	INPUTS
196 LONG	213	REAL	INPUTS	176	ONX	REAL	INPUTS	REAL	INPUTS
214 ONY	176	REAL	INPUTS	142	ONZ	REAL	INPUTS	REAL	INPUTS
222 OFILF	142	REAL	INPUTS	125	ONV	REAL	INPUTS	REAL	INPUTS
0 OTIME	125	REAL	INPUTS	152	ONW	REAL	INPUTS	REAL	INPUTS
5 PLOTTH	152	REAL	INPUTS	146	ONX	REAL	INPUTS	REAL	INPUTS
3 PNT	146	REAL	INPUTS	125	ONV	REAL	INPUTS	REAL	INPUTS
347 P2	125	REAL	INPUTS	152	ONW	REAL	INPUTS	REAL	INPUTS
354 P2	152	REAL	INPUTS	146	ONX	REAL	INPUTS	REAL	INPUTS
216 Q0	146	REAL	INPUTS	125	ONV	REAL	INPUTS	REAL	INPUTS
267 Q01	125	REAL	INPUTS	152	ONW	REAL	INPUTS	REAL	INPUTS
271 Q02	152	REAL	INPUTS	146	ONX	REAL	INPUTS	REAL	INPUTS
361 Q03	146	REAL	INPUTS	125	ONV	REAL	INPUTS	REAL	INPUTS
372 Q04	125	REAL	INPUTS	152	ONW	REAL	INPUTS	REAL	INPUTS
382 Q05	152	REAL	INPUTS	146	ONX	REAL	INPUTS	REAL	INPUTS
774 Q06	146	REAL	INPUTS	125	ONV	REAL	INPUTS	REAL	INPUTS
17 Q07	125	REAL	INPUTS	152	ONW	REAL	INPUTS	REAL	INPUTS
75 Q08	152	REAL	INPUTS	146	ONX	REAL	INPUTS	REAL	INPUTS
13 SF9T	146	REAL	INPUTS	125	ONV	REAL	INPUTS	REAL	INPUTS
21 SLAT9T	125	REAL	INPUTS	152	ONW	REAL	INPUTS	REAL	INPUTS
63 SSV9	152	REAL	INPUTS	146	ONX	REAL	INPUTS	REAL	INPUTS
1 START	146	REAL	INPUTS	125	ONV	REAL	INPUTS	REAL	INPUTS
166 SPOH	125	REAL	INPUTS	152	ONW	REAL	INPUTS	REAL	INPUTS
55 TH9T	152	REAL	INPUTS	146	ONX	REAL	INPUTS	REAL	INPUTS
0 TIME	146	REAL	INPUTS	125	ONV	REAL	INPUTS	REAL	INPUTS
376 TAP	125	REAL	INPUTS	152	ONW	REAL	INPUTS	REAL	INPUTS
4 TPFV	152	REAL	INPUTS	146	ONX	REAL	INPUTS	REAL	INPUTS
42 TRESID	146	REAL	INPUTS	125	ONV	REAL	INPUTS	REAL	INPUTS
104 YOMP	125	REAL	INPUTS	152	ONW	REAL	INPUTS	REAL	INPUTS
10 VCT	152	REAL	INPUTS	146	ONX	REAL	INPUTS	REAL	INPUTS
1 V92P	146	REAL	INPUTS	125	ONV	REAL	INPUTS	REAL	INPUTS
56 XWV	125	REAL	INPUTS	152	ONW	REAL	INPUTS	REAL	INPUTS
751 XOTX	152	REAL	INPUTS	146	ONX	REAL	INPUTS	REAL	INPUTS
153 XOTZ	146	REAL	INPUTS	125	ONV	REAL	INPUTS	REAL	INPUTS
124 XSALF	125	REAL	INPUTS	152	ONW	REAL	INPUTS	REAL	INPUTS
147 XV92P	152	REAL	INPUTS	146	ONX	REAL	INPUTS	REAL	INPUTS

241 20  
20 830  
271 003

EXTERNALS TYPE ARGCS  
 HCOMP 9  
 MATCAN 2  
 4M 3

STATEMENT LABELS

0 10 0 15  
 0 60 24 800  
 75 940 157 850

LONGS LABEL INDEX FROM-TO LENGTH PROPORTIONS  
 7 10 1 19 40 60  
 232 15 1 110 113 160  
 233 1 1 111 113 170

NOT INWER



SUBROUTINE HSNIG 24/74 OPTED TRACE PAGE 5

FTN 4.548085 05/25/75 17.29.45

LOADS LABEL INDEX FROM-TO LENGTH PROPERTIES  
264 50 I 120 121 49 INSTACK

COMMON BLOCKS LENGTH  
CONTROL 9  
INPUTS 67  
NAV 56  
TPAJN 182  
21

STATISTICS  
PROGRAM LENGTH 4013 257  
CM LABELED COMMON LENGTH 5173 335



VARIABLES	SV	TYPE	PELOCATION	225	GAINS	REAL	APDAY	NAV
112 FLATT	REAL	ARRAY	NAV	74	H	REAL	APDAY	NAV
71 G92P	REAL	ARRAY	INPUTS	14	HSNTT4	REAL		INPUTS
15 HSDINC	REAL							
137 HV92P	REAL	ARRAY	NAV	11	I	INTEGER		CONTROL
100 CYL	INTEGER		CONTROL	19	ICMCP	INTEGER	ARRAY	NAV
21 ICPIN	INTEGER		INPUTS	253	ICMCP	INTEGER		INPUTS
21 ICPIN	INTEGER		INPUTS	21	ICMCP	INTEGER		INPUTS
5 ICPIN	INTEGER		CONTROL	51	ICMCP	INTEGER		CONTROL
21 ICPIN	INTEGER		INPUTS	5	ICMCP	INTEGER		INPUTS
12 ICPIN	INTEGER		INPUTS	57	ICMCP	INTEGER		INPUTS
16 ICPIN	INTEGER		INPUTS	115	LAT	REAL		NAV
100 LONG	REAL		NAV	213	ONX	REAL		NAV
214 ONV	REAL		NAV	215	ONV	REAL		NAV
222 OFILTR	REAL	ARRAY	NAV	175	ONV	REAL	APDAY	NAV
9 OTIME	REAL		CONTROL	142	ONV2P	REAL		NAV
5 PLOTIN	REAL		INPUTS	2	PLTIME	REAL		CONTROL
6 PONT	REAL		INPUTS	1	PTIME	REAL		CONTROL
216 Q2P95	REAL	ARRAY	NAV	9	Q2P95	REAL	APDAY	NAV
17 QNO	REAL	ARRAY	NAV	65	QNO	REAL		INPUTS
3 QTIME	REAL		CONTROL	7	QSTP	REAL	APDAY	NAV
26 SALT	REAL		NAV	15	SALT	REAL		INPUTS
62 SSXN	REAL		INPUTS	53	SSXN	REAL		INPUTS
64 SS70	REAL		INPUTS	3	SSXN	REAL		INPUTS
4 STOP	REAL		INPUTS	145	SSXN	REAL	ARRAY	NAV
63 THICOR	REAL	ARRAY	NAV	55	THICOR	REAL		INPUTS
50 THITPQ	REAL	ARRAY	NAV	13	THITPQ	REAL		INPUTS
4 THICV	REAL		CONTROL	1	THICV	REAL		NAV
42 THICV	REAL	ARRAY	INPUTS	174	THICV	REAL	ARRAY	NAV
11 V92P	REAL	ARRAY	NAV	197	V92P	REAL	ARRAY	NAV
66 WNV	REAL	ARRAY	NAV	12	WNV	REAL		NAV
152 XN	REAL	ARRAY	NAV	125	XN	REAL		NAV
146 XS2PHI	REAL	ARRAY	NAV	124	XS2PHI	REAL		NAV
126 XCP92P	REAL	ARRAY	NAV	147	XCP92P	REAL	APDAY	NAV

STATEMENT LABELS

LOOPS	LABEL	INDEX	FROM-TO	LENGTH	PROPERTIES
1	10	1	28 TO	57	INSLACK

COMMON	BLOCKS	LENGTH
CONTROL	9	
INPUTS	67	
NAV	56	
	182	

STATISTICS

NO. OF DATA LENGTH	129	19
NO. OF DATA LENGTH	472	314

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